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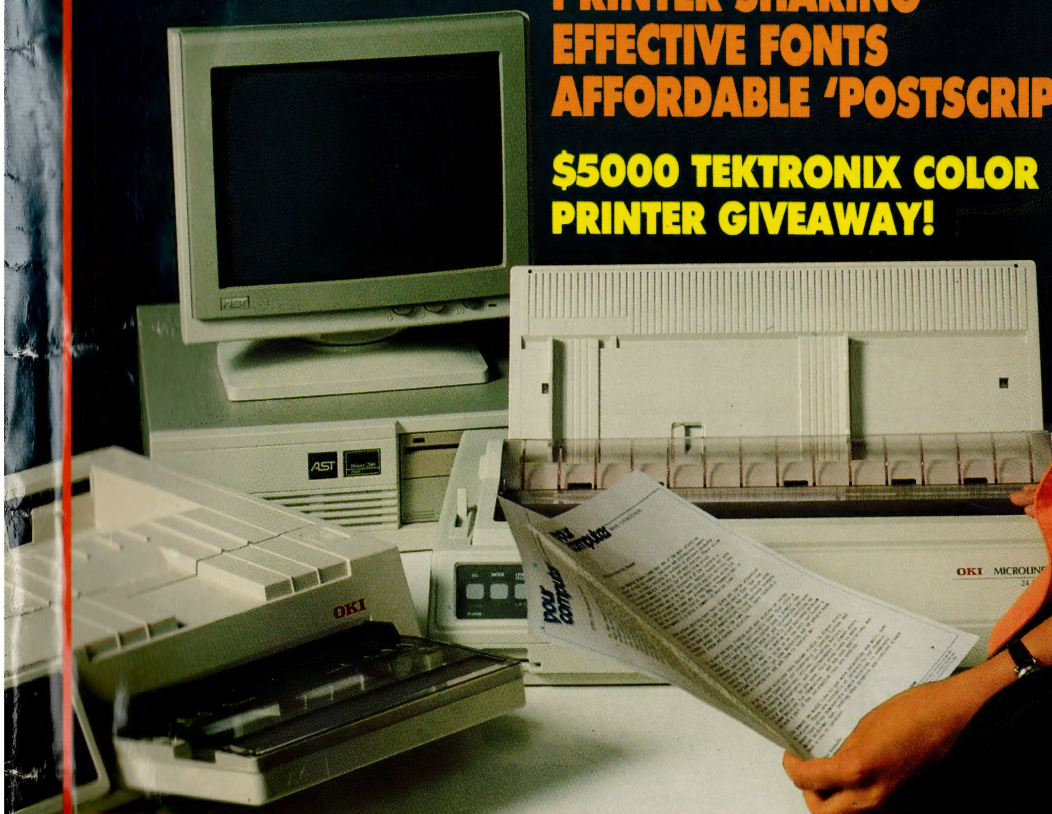
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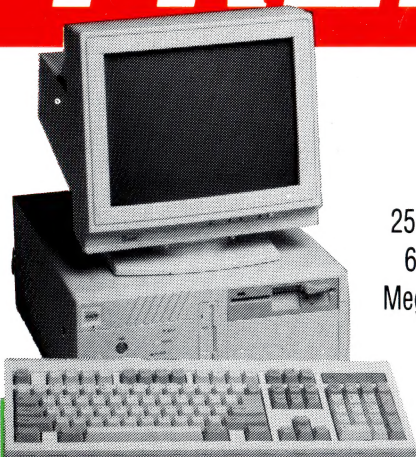


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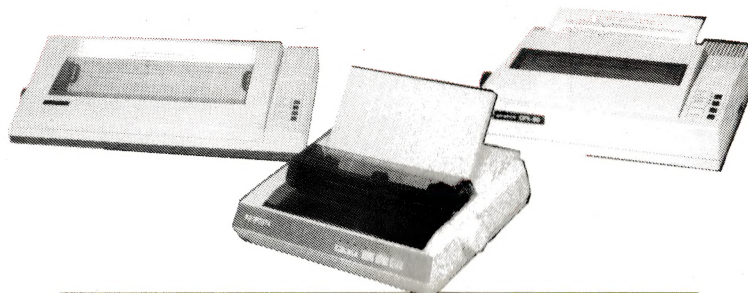
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THE BUSINESS OF PRINTERS

18



LAPTOP CLINIC

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NEXT MONTH INCLUDES

For most businesses, the choice of a printer will be based on print quality versus price and a single-color dot matrix or laser printer will be suitable – but color is needed for many applications such as CAD and presentation graphics. Part 2 of our Printer feature will discuss the color alternatives for printing, from dot matrix machines to inkjets, bubble jets and thermal printers, and how to choose a suitable machine – the second part of 'Coloring the 1990s' will discuss the technology behind color printing. We'll also have the second part of 'Beneath Neural Networks', covering heuristics, neural stars and bars, and Turing's theory. And – a feature piece on road paving by computers!

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MARCH 1990

FEATURES

Printers – Part 1

The first peripheral most users buy is a printer – but how do you decide which is the best for your needs, not only today, but several years from now?

ColorQuick Giveaway!

Win a \$5000 Tektronix ColorQuick inkjet printer!

Coloring the 1990s – Part 1

What is 'color' and how do you define a color that is device independent? That was the problem that faced Australia's Tektronix – Pierre Cochrane reports on the solution.

A Hardie secretarial solution

James Hardie found the solution to their secretarial work with Olivetti ...

BSA calls for action against software piracy

Piracy is big business world-wide and the computer industry is fighting back!

Beneath neural networks – Part 1

Neural network research is leading us to a machine that thinks, learns and finds solutions the same way the human brain does – but no-one knows how the brain works!

EDI – the legal challenge

Electronic data interchange (EDI) will soon be part of every day life, but what are the legal implications?

Hypertext or just hype?

Stewart Fist considers whether Hypertext will only be a knowledge-junky's sand pit or an indispensable navigator through the world of information.

A flight of scribes

Late last year, 200 journalists from Australia, New Zealand, Canada, the United States and Europe were invited by Toshiba to visit Japan for the release of two new additions to their already extensive range of laptops.

REVIEWS

Hebrew quiz

This public domain Hebrew tutor reinforces Hebrew vocabulary rather than teach it from scratch.

Mac-word power – Writenow and WordPerfect

In the last of our three-part evaluation of Macintosh wordprocessors, Stewart Fist considers two older programs that have recently been revamped and re-released, and summarises his evaluations.

Atari's ST for music

A home music studio based on an Atari ST is now within reach of both amateurs and professionals – Gavin Hammond tried one variation on the theme.

Hard copy!

Two books for beginners: *A Concise Introduction to dBase*, and *WordPerfect*.

FOR USERS...

Gathering of the CLANN

Jillian Hamilton catalogs an application for CDs in libraries ...

Laptop Clinic – Part 5

Would you like to sail away on a yacht or go bush with your computer? Tom Moffat tells how to hook up some useful gadgets to a laptop and charge batteries without mains power.

Assembling QuickBasic – Part 9

Direct manipulation of matrixes is perhaps the largest single omission from the 'Microsoft standard' implementations of Basic. Since QuickBasic is so much faster than interpreted Basic, this omission can be overcome with routines.

National BBS Listing

Twit Sysops

New Products

Need a 21 MIPS personal mainframe? An I/O controller? Formatted floppies? A removable hard disk? Or, even 7 days' free accommodation for two at a choice of Australian resorts?

Your Mac

Portable, or transportable

Simple security

Small systems have simpler security requirements than big ones – here are the simple steps to PC security.

The Forth Column

Forth applications

Your IBM

AskSam!

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Small goodies

IBM Underground

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Your Amstrad

Work and relax

Rural Ram

The Star Micronics NX-15.

Your Amiga

A few of my favorite ...

Your Atari

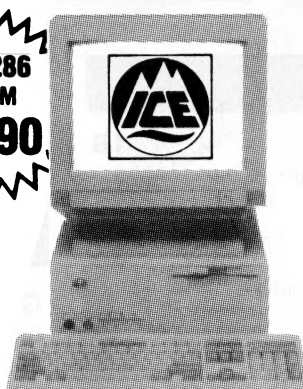
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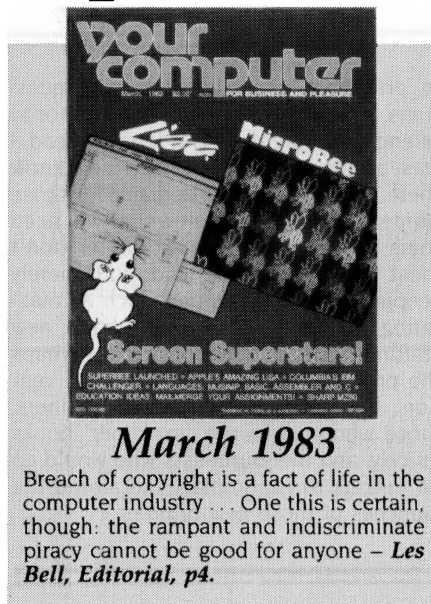
JAKE
KENNEDY

Pay for it!

THE HIGH price of software is always a good topic to raise over a beer with a dealer. In the first five minutes you will hear of the high cost of supplying the Australian market: the fact is that, with our comparatively small market and the high cost of money here, it's not possible to buy from overseas suppliers at the highest discount rates (which are usually the basis of home market selling prices). Add the cost of freight and incidentals to that and the fact that Sydney is one of the most expensive ports in the world for clearing goods, plus the fact that there is a local, national distributor added to the supply chain, plus all the other facts that are currently squeezing small businesses, and it's hard to resist offering to shout for the night.

(Me? I sympathise with both sides – I've always had a natural inclination to barrack for the underdog and I see most dealers and most users in that position: they are not the ones who are calling the shots.)

But, for users the cost of software is greater than just the purchase price. Lack of technical support can add a significant cost – so many times I've heard business users comment that a package wasn't doing half the things the ad said it would, because nobody knew how to make it



Breach of copyright is a fact of life in the computer industry... One this is certain, though: the rampant and indiscriminate piracy cannot be good for anyone – **Les Bell, Editorial, p4.**

drive the printer, or, for some reason the automatic install procedure didn't work with the user's hardware configuration and the only answer to a cry for help is: 'But it should'. The software wasn't being used to its potential and much, if not all, of the price paid was wasted.

The business then usually has two choices: to buy a second product (that

might work) or 'borrow' a copy of another package that has some user support (the 'lender'). Which choice do you think is made most often?

But the reason that happens, explains the dealer wiping Foster's froth from his moustaches, is that, with all the piracy going on in Australia, no one can afford to offer a competently staffed technical support service. It's difficult to argue with that since the number of software packages sold in Australia for every PC in use, is just over half the US ratio and is much lower than most other western countries. So the dealer feels that for every package sold, there's one he doesn't sell.

Of course, small businesses are hardly the prime culprits in the piracy case – that's not to say their actions are any less illegal or immoral. The biggest offenders by far are the biggest users – the government and 'corporates'. The action the software industry is taking against them is told with some interesting facts and figures in 'Broadside Against Software Pirates' on page 55 – whether you agree with them or not, there are some good arguments there.

My feelings? Well, if you are going to make (or save) money by theft, you should pay for it, regardless. □

Future Features

IN ADDITION to our application stories and other informative pieces, each month we present features designed to keep you informed about the world of personal computing –

May 1990

Add-on Atlas: Turn your machine into a dream machine for productivity with a '486 motherboard, 16Mb of RAM, dual monitors, 300Mb ESDI hard disk, a fax/modem, video digitiser and voice recognition.

June 1990

Unix and PCs: The rapidly increasing power of hardware has made a PC-based system a real alternative to minicomputers for sites with a number of on-line users – and 21-year-old Unix has come of age, offering an alternative to other multiuser operating systems.

July 1990

Desktop Presentation: Desktop publishing, computer-based videos, presentation graphics, scanners... the tools now available to all businesses enable them to make effective, low-cost presentations with a professional cast.

August 1990

Monitors: Whether you want to upgrade your PC or Mac monitor to color, add a VGA card or find a monitor to use with your portable or new system, our survey will bring your choice into focus.

September 1990

Entry-level PCs and Networking: As the price of power drops, the low-price machines have become more powerful and now offer more than ever to small business users. Our survey and guide to PC purchasing will show you how to match a system to your needs. Also in this issue is

a special feature on understanding, choosing and implementing a PC network.

October 1990

Communications: Our indepth coverage of electronic communications will tell of the latest developments in 'connectivity' and present an overview of the hardware and software that's bringing it all together – from the latest in modems and fax cards to the vast range of online services.

Application stories – particularly those with the same theme as our features – are always welcome. Because of lead times, material must be received at least eight weeks prior to the month of intended publication. Please address editorial enquiries on our features to Mark Cheeseman, (02) 693 4143, and advertising enquiries to Mark Wilde, (02) 693 6646.



HOWARD
KARTEN

Printers

Recently, I've heard people talking with great excitement about the future of printers. Color printers are coming, 'tis said. I've seen some of the special purpose printers, and they are neat, indeed. For example, at a trade show, I saw a printer for printing photographic images. It did some beautiful stuff. Made accessible to amateur photographers, that kind of printer would be a terrific way for them to remove thumbs and other foreign matter from photographs. If I could buy time on an image-processing computer and printer, I'd be there in a minute, doing my own photo editing and printing. (The idea of a high-quality printer for image processing really does give a whole new meaning to the term 'photo editor', doesn't it?)

Other kinds of printers, like color ink-jet printers or the ones with multi-color ribbons, will be terrific. They'll be a natural for some aspects of desktop publishing. Obviously, the risk is that desktop publishers will rush to forget the KISS rule (Keep it Simple, Stupid!) and repeat mistakes such as font overexuberance. However, if past history is any guide, there's some great things ahead for us all – but without sufficient caution, the only beneficiaries will be manufacturers and their ad agencies.

The industry markets fairly well – *vide*, the ubiquity of computer products, and in particular, unused computer products. Partly, this is another way of saying the industry is excellent at creating artificial excitement. Another thing, it turns out in quantity, if not always in quality, is prognostication. Example: years ago, some marketing geniuses thought, somehow or other (or was it hoped, or dreamt?) that we would all *enjoy* lugging around semi-fragile 'portable' computers approximately the size and weight of a very large reference book. Anyone seen one of them at the airport recently? [Actually, I have. Once. The clown in the seat next to me managed to bash me in the shins with it.]

How do they know?

SO, WHEN I heard a while back about the coming boon to be provided by advances

in printers, I naturally had some questions. For once, I was smart enough not to offend by asking them out loud. Instead, I was asking myself: how do they know there will be a general demand for those printers? How do they know they will need them, or buy them? For that matter, don't most folks have their hands full, merely keeping up with essentials such as mastering spreadsheets and whizbang new features? I began to suspect that perhaps the principal beneficiaries would be vendors, their advertising agencies, trainers, those who could write 'explainer' books quickly, and the journalists who would go on junkets to exotic places to attend the launches of those new printers.

Peddling polychromatic printers would not be the first instance of a technology in search of an audience.

I got to thinking about this in part because of a disagreement I had with Ms. Computer Writer. Every marriage has its continuing disagreements and jokes. In our case, it's ... well, it's so weird, I hesitate to mention it. Nevertheless, the interests of honest journalism and serving YC's readers comes before personal squeamishness, so here it is. I have some strong epistemological tendencies, so perhaps ten or 20 times a day, I hear myself asking, 'what's the data to support that contention?', or 'how do you know?', or some variation thereof. Essentially, when I hear the claim that a certain fact or statement is true, I like to know that is known – that is, the scientific or other basis for the claim.

So the first thing I want to know is, how do these vendors know there really is a demand for them? Peddling polychromatic

printers would not be the first instance of a technology in search of an audience.

Next, think about windows for a moment. There's very little data about how people use concepts and facilities like this, which have been around for a while. (How do I know? Trust me, I know. Remember that column I wrote recently about my use of databases? *That's* how I know. How often do *you* use your windowing facilities, and how effective are you in using them? Hmm?) If no-one knows how older technology like windows are being used, how on earth are people going to use multiple colors effectively and sensibly in the same document?

Probably badly, that's how. I bet the same malefactors who were responsible for the Great Font Craze of 1988 will be the same ones who will create the Color Craze of 1990. No doubt we can look forward to multi-colored documents, with varying colors to indicate degree of emphasis: red for slight emphasis, orange for greater emphasis, and so on, through the spectrum to violet for the most extreme emphasis. Eventually, there will have to be an inter-vendor committee to establish standards. No doubt someone will have to create a Help window listing the colors of the spectrum. Everyone will learn who the famous Roy G. Biv is. (Hmm...think of the burden this will place on readers! To fully understand the tone of what they're reading, they'll have to learn the code, too, regardless of how they feel about computers!)

Using conventional printing techniques, you must pass every sheet of paper through the presses once per color. Two colors on a page means two passes and twice the expense. Now, with a color printer by your desk ... And consider this: copies of multi-colored documents made on the office copier will inevitably lose information! So printing stuff on the office color printer might be a way to provide some protection against unauthorized copying!

I can just imagine some of the other things we can look forward to. No doubt we'll see dialog in color, to add additional indicators of the emotion a speaker is ex-

periencing Books will start printing sentences like 'Oh, I'd *love* to have one of those,' she said, her voice showing envy' — with the spoken words in (of course!) green. No doubt some artist will do some kind of 'conceptual' work in which every character has his own color. It would certainly make it easier to read some of those espionage novels: Commies would speak, spy, and think in red, of course; CIA agents in red, white, and blue, MI5 men with a Union Jack motif. . . . Life's not going to be pleasant for publishers. Copy editors will probably go crazy. They'll have to check color consistency as well as grammar!

A recent comment from Ms. Computer Writer sums it up fairly well. 'This time, let's try the verbs in green,' she noted, somewhat drily (and with a definite black tinge).

Color accounting

MORE WIDESPREAD use of color printers might be a terrific boon to spreadsheets. As business graphics demonstrated vividly, pictures really *were* worth 1000

words: a chart was much easier to grasp than a sleep-inducing table. With color, you could direct your boss' attention to unexpectedly good spreadsheet cells in some appropriate color (royal purple, perhaps?) and unexpectedly bad ones in, say,

*Copy editors will
probably go crazy.
They'll have to check
color consistency as well
as grammar!*

shocking pink. Cells in which the results were questionable, or doubtful, or based on shaky assumptions, might be shown in yellow, to indicate 'caution'. No doubt a universal standard would develop over time — a subcommittee of the committee I mentioned above, perhaps.

The application of color to basic accounting software is so obvious, and so elementary — red ink or black ink — it needs no belabouring here. Other types of software could use color printing as well. Calendaring and scheduling software, for example marking 'red letter days' when printing out someone's calendar. (This is so obvious I am almost embarrassed to mention it, except for one thing: if I don't, this column will wind up with the most feared thing in magazine publishing — unfilled, white space at the bottom of a column.)

Of course, I don't want to get left out of this burgeoning color phenomenon, so I've been thinking about a way to get in on it. I've always figured this column would be much more . . . er . . . colorful — it could be done in some nice color: soft earth tones, perhaps. To practise, I prepared this month's column on a color printer, to see how it would look, and included colorising suggestions when I transmitted it. Now if only I could persuade YC's editor that the extra expense of printing it in multi-color would be worth it. □

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Desktop video

DESPITE THE BOOM in consultants over the last few years, many government departments in Canberra still run their own computer training facilities. Video tape training programs are an important part of these courses, and unfortunately, are extremely expensive when done by private companies. Production fees range from \$20,000 to \$100,000 for what most of us would consider fairly ordinary tapes.

Some departmental trainers have tried saving money with their own productions. These efforts have until now often been limited in their scope because of the high cost of equipment.

However, the Department of Community Services and Health was recently shown a low cost solution from Commodore Business Machines. The result is a true desktop video with professional quality that costs much less than telephone number prices. In fact, the system can be put together by anyone buying over the counter at a local computer store.

To start with, you need a Super-VHS video camera. The one at the demonstration was a Panasonic Camcorder using full size Super-VHS tapes. The camera feeds into a GEC genlock connected to an Amiga 2000. The Amiga then outputs to a Panasonic video effects editor/mixer. The

mixer feeds into a Super-VHS Professional VCR with frame-by-frame edit facilities. Once again, the one at the demonstration was from Panasonic. The final result was displayed on a Sony 67cm color monitor with stereophonic sound.

The all up cost of this electronic masterpiece is around \$18,000. Now, while this sounds like a lot of cash (some of us can remember when there were houses for sale in Sydney for \$18,000), when compared with the results, it performs as well as studio systems costing \$50,000 and more.

The Super-VHS system produces copies of VHS tapes which are as good as first generation standard VHS. This is important because once you have your training tape completed, you will need copies.

The Amiga 2000 provides the titles and superimposes any art work or animation needed on the tape.

If necessary, the total price can be cut further because while the Panasonic Professional Super-VHS VCR costs around \$7,000, there are Super-VHS VCRs with fewer features for about \$2,500.

The executives from the Community Services and Health Department watched a live demonstration where video frames were grabbed from the camera, titled on the Amiga, and then fed to the Super-VHS VCR for insert editing. Unlike so many demos of new computer and electronic gear, this system worked perfectly the first time round.

Perhaps Commodore should be having a serious talk with Panasonic about a marketing

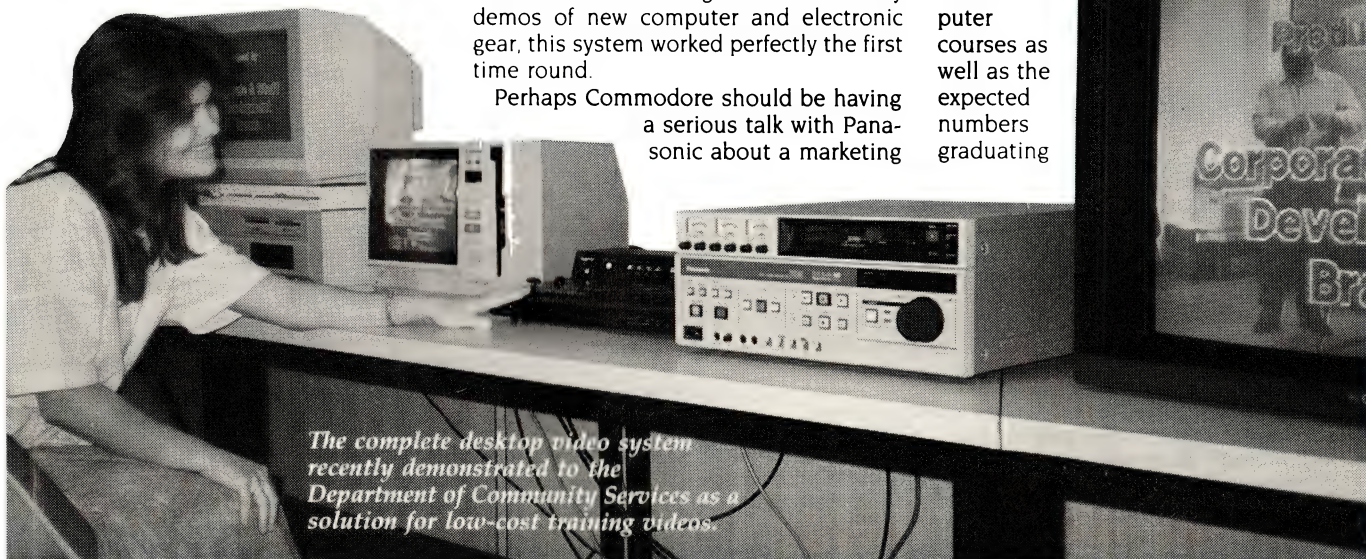
ploy. The desktop video demonstration was helped along by Gregg Faulkner who writes the 'Your Amiga' column in YC.

Computer enhanced migration

AUSTRALIA IS STILL suffering a shortage of skilled computer people. With this in mind, the Department of Immigration has accepted a plan to speed up the entry of skilled computer workers into Australia.

An organisation called the Information Industries Education and Training Foundation, has sponsored the speedy migration package. Paul Stubing, the executive director of the foundation, said that it made good sense to be able to get particular computer people from overseas without delay. He also said that the shortage of computer people in Australia was a continuing problem. The IETF has already undertaken a draft survey of 500 computer companies, and a more detailed report is due out next month. The forthcoming report is about TAFE and higher education computer training, and will focus on the availability and type of courses in computer related areas, and at future needs of the industry.

The abilities of students enrolling in computer courses as well as the expected numbers graduating



The complete desktop video system recently demonstrated to the Department of Community Services as a solution for low-cost training videos.

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* Data on the world-wide Information Systems industry compiled by Datamation shows that Olivetti revenue in 1988 was more than Amstrad, Commodore, Compaq and Epson combined.
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in the next decade are also being covered in the report.

Computers generate more dollars

ACCORDING TO THE Australian Information Industries Association, Australian computer business generated \$5.1 billion in 1989. Revenue was up 12 per cent to \$7.4 billion, and exports increased 17 per cent to \$379 million. Investment, which rose 40 per cent last year, is predicted to be even higher this year.

Executive director of the AIIA, Bob Mounic, predicted that there would be a continuing shortages of skilled computer people. The federal government received over \$560 million in taxes from the computer industry in 1989, which represents 11 per cent of total revenue.

Commenting on the industry's performance, IBM Australia's managing director, Brian Finn, said there is a need to see a significant increase in export earnings. He said that while the IBM plant at Wangarratta was highly successful with exports of PS/2s to Asia, it was being inhibited through a lack of local component makers. Here he referred specifically to local transformers, power supplies and disk drives. Similarly with software development, Finn said that the supply of people with the right skills was tight.

Calls for accelerated immigration made him despondent because 'that short term solution has been with us now for the long term,' and the underlying problem of computer skills shortages is not being addressed.

IBM had generally found a positive response to its export business to the Asian region. However, other Australian computer companies wishing to export to Asia face two challenges. 'These are firstly a shortage of capital to fund an overseas presence, and secondly, access to overseas markets.'

With this in mind, Finn said there needed to be stronger links between Australian and international companies. IBM has recently put \$20 million into a local company called Paxus Corporation, thus acquiring a 15 per cent shareholding. He believes local computer companies still find the going tough when raising investment money.

Commenting on the progress of Senator Button's original 1987 plan for the Australian computer industry, he said that more encouragement was needed to establish partnerships with Australian companies.

'An agreed definition of Australian companies is today rather elusive, and is destined to become more so. We need an



An Amiga 2000, small screen monitor, video mixer and Super-VHS VCR performs as well as \$50,000 systems for making inhouse training videos.

international view ... not an introspective parochial one if we wish to build an internationally successful industry.'

Electronics makers duty slug

MANUFACTURING ELECTRONICS equipment in Australia has two natural disadvantages according to the chief executive of Datacraft Ltd, George Kepper. Firstly, because many components used in computers are imported, they are charged duty. However, there is no duty loading on finished electronic products. Therefore, without a bounty from the government it is cheaper to have manufacturing done offshore than to import.

The government is proposing to remove its bounty for companies manufacturing in Australia after June this year. Kepper believes this will have a disastrous effect on the Australian electronics industry.

Up until now, the bounty has helped offset the duty on imported electronic components. For example, there is a 21 per cent duty on PC boards, connectors, resistors, capacitors, transformers and inductors. He says that as long as there are tariffs on components, Australian electronics makers cannot compete in either the home or international markets.

With modern electronic equipment, the component input represents more than 70 per cent of the factory cost. The main difference between manufacturing in Australia and Singapore, for instance, is the overall cost of electronic components. 'Although direct labor costs in Singapore are approximately 40 per cent lower than in Australia, this does not have a dominant effect on the cost equation.'

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INTRO-FACES

Each month we bring you the names and faces behind the computer industry . . .

AA Larson



PREVIOUSLY WITH Broadband Network Communications Pty Ltd, AA (Andy) Larson was one of the principals involved in

the recent establishment of Integrated Networks Pty Ltd.

The new company is a professional networking organisation offering a complete range of services in this field, including network consultancy, design, installation, certification, maintenance and training, using multi-vendor hardware integrated into a unique multiple technology system.

Integrated networks has been established as a vendor-independent network integrator with the ability to evaluate all LAN vendors, recommend, and if required, supply, install and commission the best system to suit a client's specific needs. Services offered encompass broadband, baseband, Ethernet, Token Ring and fibre optic systems. Techniques developed by two of the directors of the new company, Andy Larson and Greg Taylor, in projects installed throughout Australia and New Zealand. This ensures the successful integration of multi-vendor hardware into a unique multiple technology system.

Ian Holmes



SYBASE AUSTRALIA Pty Ltd has promoted Ian Holmes to the newly

created position of sales director. He will be based in Sydney and responsible for all sales activities within Sybase Australia.

Holmes was previously a senior sales executive with the company, and has been with Sybase Australia for 13 months, working in the financial market sector. He has over 18 years experience in the computer industry, and previously held senior management positions in sales and marketing with Data General in their Melbourne and Sydney operations.

Sybase Australia is a subsidiary of Sybase Inc., a leading vendor of relational database management systems for on-line applications. Established in 1988, Sybase Australia estimates corporate growth of 200 per cent in 1990. In the past 12 months, the number of employees has increased three-fold, and now totals 15 people in the Sydney and Melbourne offices, and has recently moved its Sydney office to new premises in North Sydney.

Tony Hughes



SOFTWARE PUBLISHING Corporation, the developers of Harvard Graphics and PFS:First Choice, has appointed Tony Hughes as its general manager for the Asia-Pacific region. He replaces Mr. Douglas Barr, who was on temporary assignment from the US. Hughes will be based in Sydney, and will have overall responsibility for the management of Software Publishing's activities in Australia, New Zealand, and South-East Asia.

Highly respected within the PC industry, Hughes has a wealth of experience in sales and marketing, including 6 years at CP Powerlink, most recently as NSW branch manager. 'We have an excellent reputation in Australia and New Zealand, thanks to the dedication and support of the existing team. With the solid foundation stones in place, Software Publishing is now ready to further develop the sales and marketing effort to end users and dealers,' he said.

Hughes also believes dealers must be totally familiar with the products they are selling, and expects to work very closely with them. 'We will be working in conjunction with our distributor and key PC dealers, providing them with knowledge of our products and an understanding of new technology as it emerges.'

Software Publishing Corporation opened its doors in Australia in 1988 and has enjoyed rapid growth since that time. The company has offices in Sydney and Melbourne, and is a leading supplier of business productivity software for the IBM personal computer and compatibles. All SPC products are distributed in Australia by MicroAustralia.

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THE BUSINESS OF PRINTERS

DOT MATRIX AND LASERS



In the first part of our annual printer feature, Mark Cheeseman covers dot matrix and laser printers, how to choose one for your business, and how to maintain it.

THE TERM DOT matrix can be used to describe virtually all printers, the only exceptions being daisy wheel, drum and band printers. However, the latter two are high-speed monsters designed for heavy-duty use with minis and mainframes, and daisy wheels are rapidly being replaced by either dot matrix machines or lasers (which also use a matrix of dots to build the image). And, inkjet and thermal printers also build up the image on paper using a series of dots – we will be looking at these as part of our color printer feature next month.

The daisy wheel printer has all but disappeared from the market, being replaced by faster and more versatile 24-pin dot matrix printers and lasers. Brother still has one daisy wheel printer in its line-up – the HR40. It runs at 40 characters per second, and has a push tractor feed and a 30 sheet paper feeder. For more details contact Brother industries, (02) 887 4344.

Dot matrix printers have a print head that holds a number of pins arranged in staggered vertical lines – a 9-pin printer, typically, has a line of 5 pins with a line of 4 next to it, and 24-pins are arranged as two rows of 12 pins, staggered so that the dots overlap. Early printers only had eight pins, but this was soon increased to nine, so that characters with descenders could be printed more legibly (you may have

seen printouts from them with a funny looking 'g': the 'descender' rests on the same line as the rest of the letters. Near letter-quality (NLO) printing was accomplished by making two passes with the print head, with the second pass offset half a dot below the first – filling in the gaps between the first set of dots on the second pass. Eighteen-pin printers achieve the same result in a single pass, with a corresponding increase in print speed, while 24-pin printers have a higher resolution still, and you can even get 48-pin models now.

Each of the pins in the print head are fired at the page at the required time by a solenoid as the entire print head moves across the paper. The ribbon is between the print head and the paper (as it is in a typewriter), which is forced against the paper by the impact of the pin – hence the name, impact printer.

The mechanical action of all these pins tends to make dot matrix impact printers rather noisy in operation, although they are not quite as bad as some older daisy wheels, which tended to sound like a sub-machine gun at times.

Colour printers are virtually identical to single-colour printers, except that the ribbon consists of four bands, each a separate colour, which is moved up or down to place the correct colour between the print head and the paper. If more than one colour is needed at a particular point on the paper, then one pass is made for each colour required, before the paper is advanced for the next line. Colour printing really lends itself to graphical work, although of course if you want multiple copies of something, each copy has to be done by the printer itself. Unless you have a colour photocopier, that is.

Laser printers share the dot matrix construction of the image with impact printers, but the way in which the image is formed is completely different. A laser printer physical resembles a photocopying machine: in both, the image is formed on a photosensitive drum, by using the reflected light from the original (in the case of a photocopier), or light from a scanning laser beam, in a laser printer.

The drum is electrostatically charged, and this charge attracts the toner powder, which is later deposited on the paper as it passes through the machine. The photosensitive nature of the drum means that the toner will be attracted to some areas of the drum, but not others, according to where the light hit the drum. A laser beam is swept over the drum, one line at a time, by a rotating mirror system, so that some



An envelope feeder, such as the one attached to this Texas Instruments microLaser, allows a laser printer to address envelopes directly, without worrying about messy labels.

areas of the drum will be charged and others not. A special correction system ensures that the beam has equal intensity across the entire page, compensating for the different angles that the beam hits the paper in different places, due to the rotating mirror.

In addition to laser printers, there is an increasing number of LED printers on the market. These use the same principle as a laser printer, but have a row of light-emitting diodes to sensitise the drum instead of a scanning laser beam. This results in fewer moving parts than a laser (eliminating the rotating mirror and associated optical correcting system), with the obvious cost and reliability benefits.

Laser printers are pretty powerful computers in their own right, with a 16- or 32-bit processor and a typically a megabyte or more of RAM. The original Apple LaserWriter had a 68000 processor, a choice partly brought about by the PostScript code, which only runs on a 68000. Most laser printers have the a member of the 68000 family as their CPU (even non-PostScript models), with many of the high-end machines having a 32-bit 68020 for increased processing of the PostScript infor-

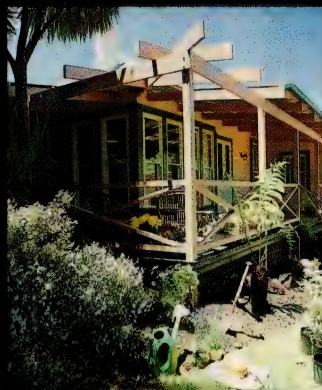
mation, resulting in a higher page throughput. Extra memory added to the printer is typically used for downloaded fonts, and more memory means that more fonts can be resident in the printer at once. For multiple fonts to be used on any given page, each of the fonts must be resident in the printer at the time of printing – either as a built-in font, or downloaded from the host computer prior to printing.

If all that processing power and memory were not enough, many high-end printers allow the connection of one or more SCSI hard disks to the printer, for the on-line storage of fonts in the printer itself, rather than having them cluttering up the hard disk on the computer, and wasting time during printing while they are downloaded. Up to 300Mb of disk storage can be attached to some printers in this way. Some printers in desktop publishing systems have a more powerful computer built in, with more memory and disk capacity, than the host computer itself!

Laser printers' speed is rated in terms of pages per minute (ppm), with most popular printers rated at 6 or 8ppm, ranging up to about 15ppm for higher-end machines. Note that this speed is the speed

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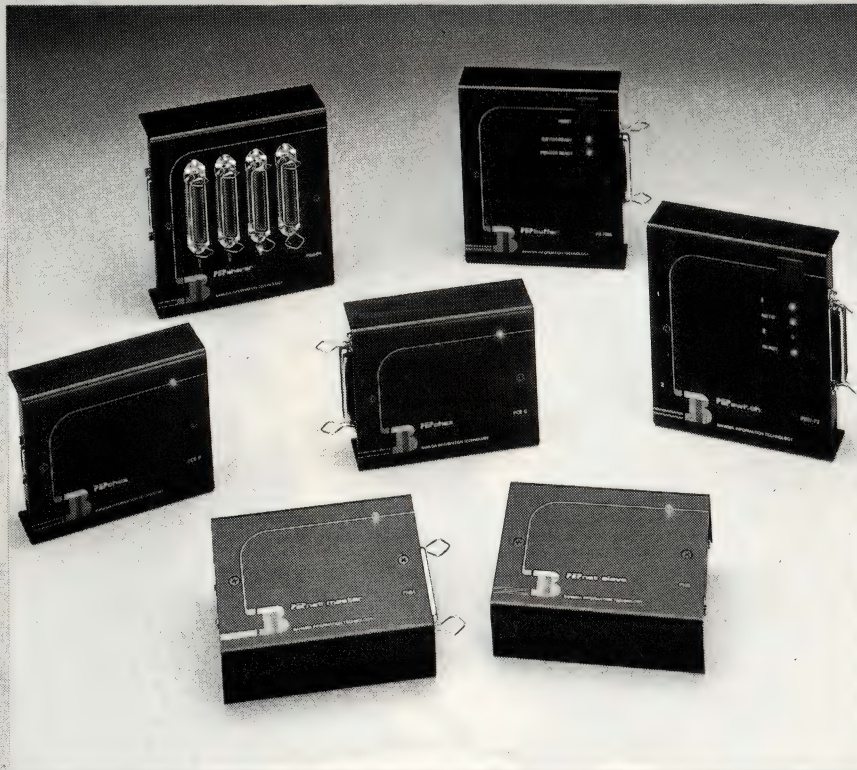
Share that printer

WHEN THERE IS a computer on almost every office worker's desk, the task of sharing printers between the computers becomes complicated. The economics of sharing printers are pretty basic – a printer and a sharer is cheaper than a separate printer for each user, in direct proportion to the number of users. In addition, it is often possible to use the money saved to buy a better shared printer rather than a number of less-capable smaller printers.

Clearly, having the single printer permanently attached to a single computer means that the user of that machine is interrupted each time anybody wants to print something. Transferring files between machines by floppy is also tedious, especially for users who are not very computer-literate.

Plugging and unplugging cables is not a very good long-term solution either – pins get bent, wires break, the gold plating wears off and connectors get trodden on. The simplest form of sharer is the manual variety, where a large multi-pole switch is mounted in a box, and connected to a number of sockets on the back of the box – these are priced from as little as \$70. When a user wants to use the printer, they have to walk to the switch box and switch it over to their computer before printing. A second trip then needs to be made to retrieve the print-out. This is fine if the printer and all the computers are located relatively close together, but can become tiresome if they are too far apart.

An automatic sharer (priced from about \$150) is a better bet if one or more of the computers are located some distance from the printer. An automatic sharer monitors the signals from each computer, and the first one to print is allocated the printer until it is finished. While that computer is printing, all the others see the printer as 'busy'. When the first computer has finished printing, a



small time elapses before the next computer can start to print, to ensure that the first computer is indeed finished.

Some of the more intelligent sharers allow print jobs to be sent simultaneously from more than one computer, rather than one computer having to wait for the other to finish.

The PEPs range of printer accessories from Banksia Information Technology gives a good idea of the type of products available. It includes sharers (for up to 30 computers), printer switches (to select one printer from several connected to the

computer), cable extenders. The latter allows parallel printers to be located up to 300 metres from the computer, using ordinary twisted-pair (telephone) cable, with full error correction. Also included in the range are parallel-to-serial and serial-to-parallel converters, to solve problems with incompatible devices.

Pricing starts at \$165, and more information can be obtained from Banksia Information Technology (Australia), Suite 205, 2nd floor, 83 Longueville Road, Lane Cove 2066 NSW, phone (02) 418 6033, or fax (02) 428 5460.

of the laser engine (the mechanical heart of the printer) itself, not the entire printer; it is only ever achieved when printing multiple copies of the same page. It does not include the time required to download the print file to the printer, or the processing time taken to convert PostScript instructions (if appropriate) to the final bit-map, which often can take several minutes for complex pages.

Dot matrix and laser printers are not capable of printing grey scales, so images

do not print with the quality which you might otherwise expect. You may be surprised to learn that the pictures in this magazine only have a resolution of 200 lines per inch. The difference here is that the presses which print *Your Computer* are not restricted to printing a single size of dot, but can print any size dot that is on the printing plate, down to a limit primarily determined by the quality of the paper being used. Larger dots appear as darker areas of the image, and smaller

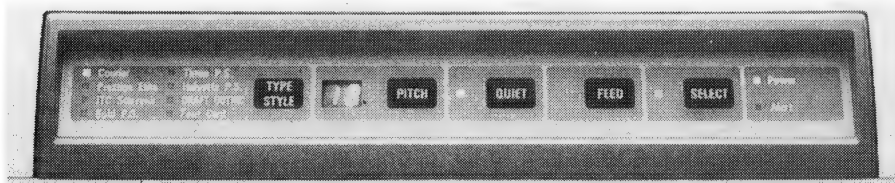
ones appear lighter.

The way in which computer printers generate grey-scales is similar, except that large dots need to be made up of a number of smaller dots. Due to this requirement of using several printer dots to make up one pixel of the original image, the resulting resolution is quite low, and the more grey scale levels are desired, the more dots need to be used for each image pixel.

Only very high-resolution output de-



Laser printers are capable of quite impressive results with images, in spite of the lack of grey scale printing. This image was scanned with a Canon IX-30F grey-scale scanner, and printed out on a Canon LBP-8 printer. The original size is 134 by 145mm.



Printers now allow most features to be controlled from the front panel, such as this on NEC's P5300 – users no longer have to master esoteric control languages and advanced modes can be used with software which doesn't know about them.

vices, such as a Linotronic typesetter with a resolution of 2540 dots per inch (that's 100 dots per millimetre), can get images with a high enough resolution *and* a wide range of grey scales to get anywhere near the quality required to achieve publica-

tion-quality images. Unfortunately the time required to process such complex images is quite high, making it quite an expensive endeavor, tying up the typesetter for many times longer than required to print a text-only page.

Fantastic Fonts

RIGHT FROM THE beginnings of dot matrix printing, the user has been limited to the fonts supplied in the printer's internal ROM. However, the 9-pin draft quality of the majority of printers in use means that the characters bore little resemblance to the 'proper' characters, as would be formed by a typewriter or typesetter. As the resolution of printers improved, it became possible to build-in several fonts with enough detail for them to be recognisable. For example, most dot matrix printers (even 9-pin ones) can now print normal, italic, and bold versions of its standard typeface. Daisy wheel printers needed a separate wheel for each different typeface, so font changing was not very popular with such machines, and a rather messy procedure at that.

Due to this requirement of using several printer dots to make up one pixel of the original image, the resulting resolution is quite low.

However, there was still no standard printer font, with each printer's character set looking slightly different from the next, and absolutely nothing like the screen fonts on the computer itself. Because computer screens used a fixed size cell for each character, proportional spacing was not possible, and if a document was printed with proportional spacing, it would look 'funny', especially if the text was justified, so that the right-hand edge of the text was aligned, as it is on this page.

Clearly, a way had to be found to design a page on the screen of the computer, and then print it out on the printer exactly as it appears on screen. What was needed was a way to send information to a variety of different printers in a standard way, so that the results from each of the printers would be identical, within the limits of the resolution of each printer.

The page could then be constructed on-screen, and then sent to the printer in the knowledge that the final printed copy will look as it does on-screen. Adobe saw the

GoScript – almost PostScript

NOT ALL PRINTERS have a PostScript interpreter built-in. This is understandable, since to add this capability to a dot-matrix printer would at least double the price of an expensive model, and even more for cheaper printers. This is due to the need for a 68000-based CPU, and associated memory, not to mention the expensive Adobe license agreement. However, there is a software solution, which makes use of the processor and memory already in your computer, in the form of a program called GoScript – a Postscript clone for PC compatibles. To use GoScript, the output is printed to a file, and then GoScript is invoked to process the file and produce a bit-image for the specified printer. A large variety of 9- and 24-pin dot-matrix printers are supported, in addition to non-Postscript laser printers such as the HP LaserJet series.

Of course, the penalty is that the hard work of creating the printed page is done by the computer's CPU, rather than the one in the printer, which means that the computer is tied up for the duration of the process – this can take several hours for complex pages at 300 dots per inch. A maths co-processor is certainly a help here, owing to the floating-point nature of font scaling, and if you have Desqview, it can be run in the background while doing something else.

Because Adobe holds the copyright on the fonts which come with PostScript, GoScript is supplied with clones of these fonts, which are pretty close to the genuine article, although not identical. There are some small differences,

such as the in '@' symbol, and some other characters in various fonts. This may be to avoid infringing the copyright of the real fonts, and most differences seem to be in characters which are less frequently used (such as Q and Z). However, the spacing of the characters seems to be identical to PostScript – a fact confirmed by printing a page of each font and comparing them over a light table with output from a LaserWriter IINTX.

So the fonts aren't perfect copies (although some of us around the YC of-

fices preferred the GoScript versions), but they are certainly close enough for proofing pages before sending them to a bureau for laser-printed or typeset final copy. If you already have an HP LaserJet (or compatible), the addition of GoScript will give you the versatility and quality of PostScript output, that will stand up to examination by all but the most scrutinous eyes. GoScript is distributed in Australia by BLAH, and is priced at \$399 for the 13-font version, and \$699 for the full 35-font edition. Phone (02) 819 6811 to learn more.



Laser printers share the dot matrix construction of the image with impact printers, but the way in which the image is formed is completely different.

is known only to the parties concerned, the price differential between a non-PostScript printer and a PostScript equipped

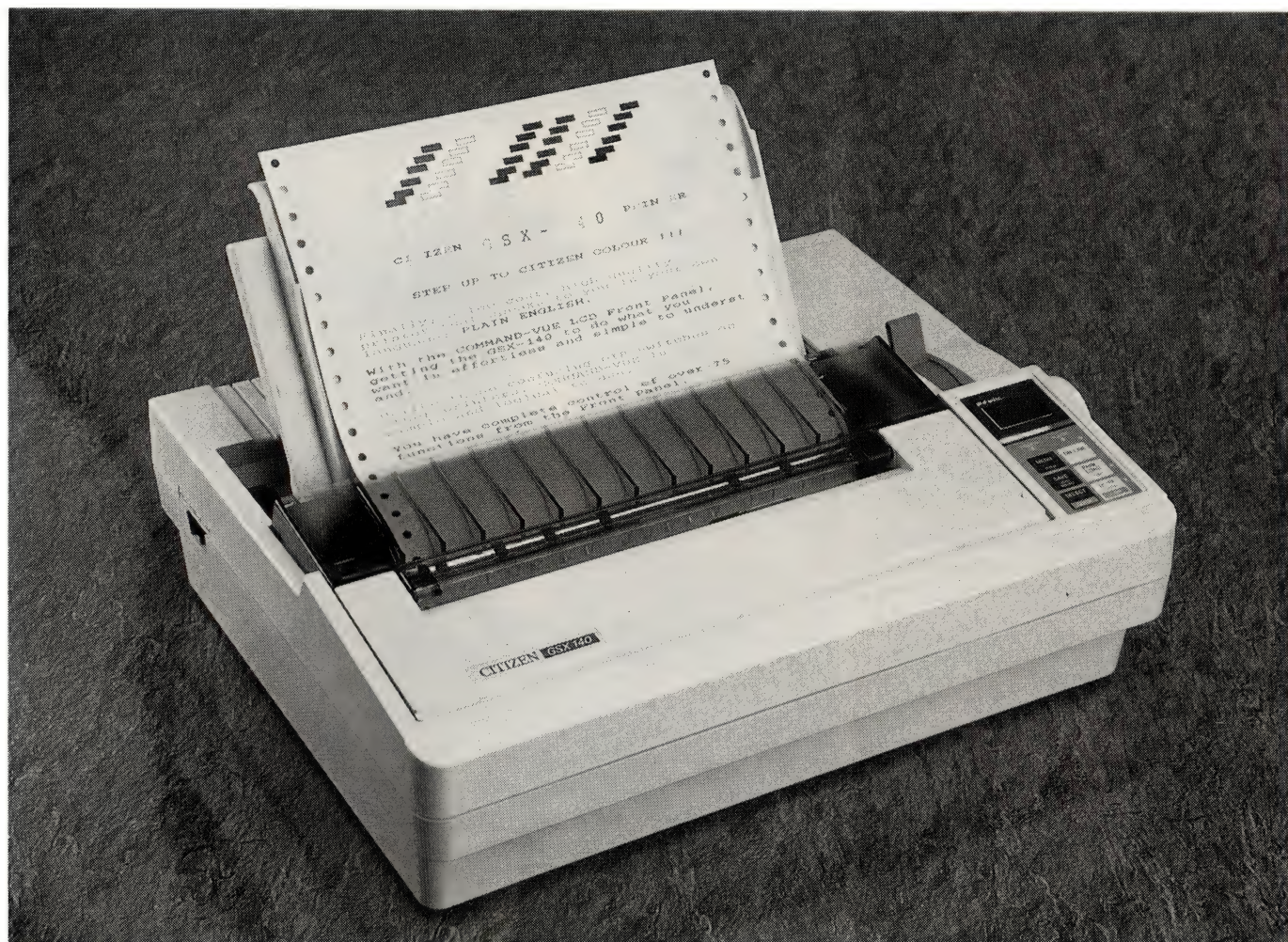
model is usually about \$2000.

However, recent events in the industry seem to indicate that Adobe's monopoly on the page-description language market, seem to be coming to an end, and fading with it all hope of having a single standard printer language. Apple has sold its share in Adobe, claiming that it did not want to remain tied to a single source for its printer languages. Clearly, Adobe's sluggishness to release its grip on the market, and to be more open with some of its proprietary scaling and coding algorithms is destined to leave the poor users with yet another double-standard.

PostScript is not the only page description language around. Hewlett-Packard have their Printer Control Language (PCL),

need for such a system, and created PostScript, which gained a tremendous following through its support by Apple, who used it in its Laserwriter range from the start. This, and the advent of suitable software, such as PageMaker and Quark Xpress, the Mac gained a tremendous lead in the desktop publishing field, and it was some time before the PC caught up.

PostScript is without doubt the most popular page description language in use today, and is supported by a wide range of laser printers and phototypesetters. What has really restricted the acceptance of PostScript is the rather steep licencing fees which Adobe charges printer manufacturers. While the actual amount which Adobe siphons off from each printer sale



Colour output is optional for virtually all dot matrix printers now. The Citizen GSX-140 (from Pantek on (03) 699 5097) shown here is a colour-capable 24-pin printer. As you might expect, the four-color ribbons are more expensive than plain black and, often, the blue or red ink runs out before the yellow or black.

but this is not as flexible, since it uses bit-mapped fonts, so that a font has to be resident in the printer at each point size which is going to be used – either built-in to the printer, or downloaded from the computer before printing. However, it does not suffer from PostScript's biggest problem – licensing fees.

The big advantage of PostScript is that instead of requiring a complete bit-image of each font at every desired point size, it stores the fonts as 'outlines', which are basically a set of mathematical instructions describing how each character is made up. When the printer needs to print a given character at a particular point size, it scales the outline to the correct size, and then fills it in. This is why PostScript

Laser printers share the dot matrix construction of the image with impact printers.

printers appear slow when they have to print a page with lots of different fonts and point sizes – each character has to be scaled individually.

Also, PostScript printers generally have more fonts built-in than HP-compatible models – the usual number is 35. Note that each different variation of a font counts as a separate font. For example,

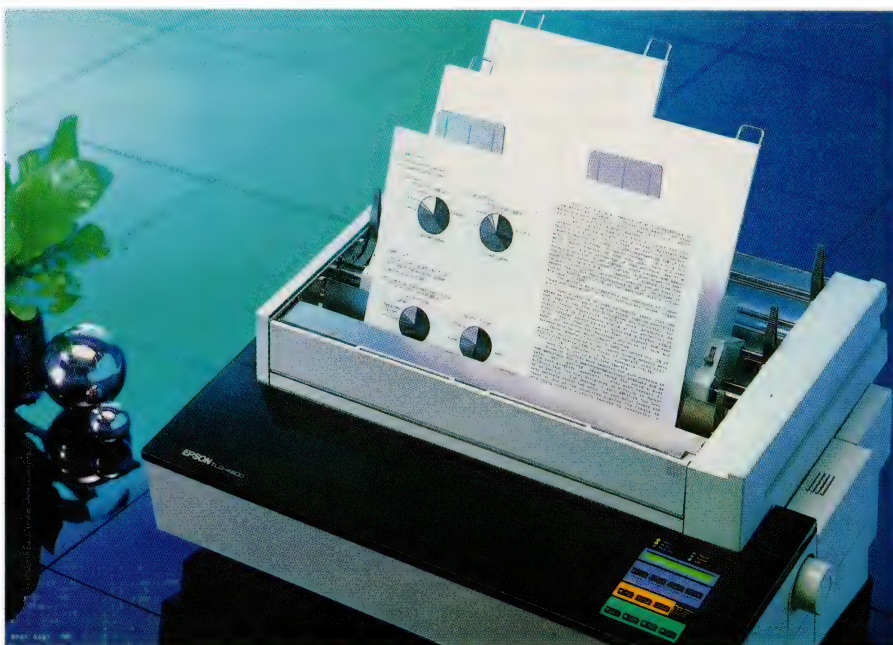
Times Roman, Times Italic, Times Bold, and Times Bold Italic, count as four separate fonts.

In addition to fonts which are resident in the printer's internal ROM, both HP LaserJet and PostScript printers allow additional fonts to be downloaded, limited by the memory capacity of the printer. Of course, the formats for these two types of downloaded fonts are different, as for the built-in fonts already discussed, so that you can't download an HP font to a PostScript printer, for example. In addition, for HP fonts, you need to download the font in each point size required in the document. HP fonts are also available in cartridge form, which plug into special slots on the printer. These then become

an extension of the internal font set, rather than having to be downloaded like RAM resident fonts.

PostScript fonts are available from Adobe (handled in Australia by Infomagic, (02) 975 1044), and a variety of third-party suppliers. HP fonts are also available from several sources. Third-party suppliers such as Bitstream are a good source of fonts for both PostScript and HP printers.

One relatively new feature which several printers have is a SCSI port, which can control one or more hard disk drives. The Apple LaserWriter IINTX was one of the first with this feature. These drives can store downloaded fonts, so that they do not need to be downloaded each time the printer is turned on. Adobe even sell a 'ready to roll' system, consisting of an 80Mb hard disk already loaded with fonts (with room to spare), with the originals on floppy in case the unthinkable should happen, and the drive spontaneously leaps from the desktop onto the tiled floor!. Called the Adobe Font Follo, it includes over 450 typefaces, and is priced at \$30,995, and is distributed in Australia by Infomagic.



Forty-eight pins is as many as you can get in a dot matrix printer – Epson were the first with their TLQ-4800, offering double the resolution of 24-pin models (the head has four staggered rows of 12 pins). Priced at \$3890, makes it more expensive than some lasers, however. For more information, contact Epson on (02) 452 0666, or fax (02) 451 0251.

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Type-outs

WHILE DAISY WHEEL printers are almost extinct these days, the daisy wheel mechanism itself is still very popular (indeed, almost universal) in modern electronic typewriters. Since most typewriters these days have some level of 'intelligence' built in, surely it would not be too difficult to connect it up to a computer for use as a printer?

In fact, many typewriter models have provision for an optional interface which can be connected to the typewriter, giving it a Centronics parallel or RS-232C serial input, or both. The typewriter can still be used in the normal way, so if the computer ever gets sick, you still have a perfectly usable typewriter to use until the computer has recuperated.

Most wordprocessing software is capable of driving a relatively 'dumb' printer, such as a typewriter. WordStar, for example, has a special typewriter driver, for such occasions. Of course, italics cannot be printed without changing the daisy wheel, but underlining and bold print are handled by backspacing over the character and re-typing it (for bold) or typing an underscore (for underlined text). This slows printing considerably, but daisy wheel printing was never fast anyway. If your wordprocessor does not have a typewriter, try using any driver designed for use with a daisy wheel printer.

Don't expect a typewriter to print as



fast as a real daisy wheel – it's only designed for human typists, and so speed is not as important a design criterion as it is in a printer designed for use with a computer. However, for applications where letter-quality printing is important, the typewriter/interface combination beats even a 24-pin dot-matrix model.

The Brother range of typewriters has many models which can be connected

to computers, and retail prices for the interfaces start at \$228 for a parallel-only unit, but models with both serial and parallel interfaces are available. The F60 interface shown here in operation with a CE550 typewriter has both serial and parallel interfaces, and installation is simply a matter of plugging the interface into the typewriter and computer, and setting a few DIP switches.



For basic printing needs, a simple 9-pin printer such as this EW300 from Toshiba, (\$498; (02) 887 3322) will suit the needs of most casual home users and many small businesses.

Choosing one

IN ADDITION TO categorising printers according to their printing method and print resolution, the workload which the printer will be expected to perform is also important. Often, the printing speed can give you some idea as to its capabilities – the faster it is, the more work you can expect to be able to get out of it in a month.

However, most printers are not designed to print flat out, 24 hours a day, 365 days per year; if nothing else, you have to stop occasionally to replace the paper or ribbon! Some (especially older) dot matrix machines would get quite hot when called upon to print a full page of bit-image graphics. Laser printers also vary widely, both in terms of page throughput and duty-cycle. Generally, the faster machines

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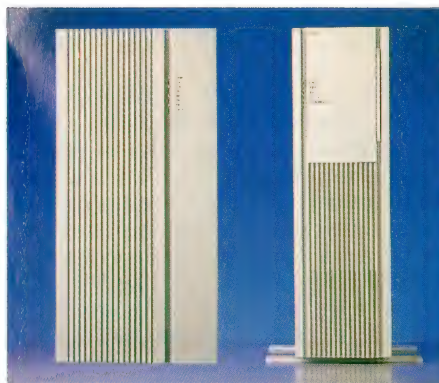
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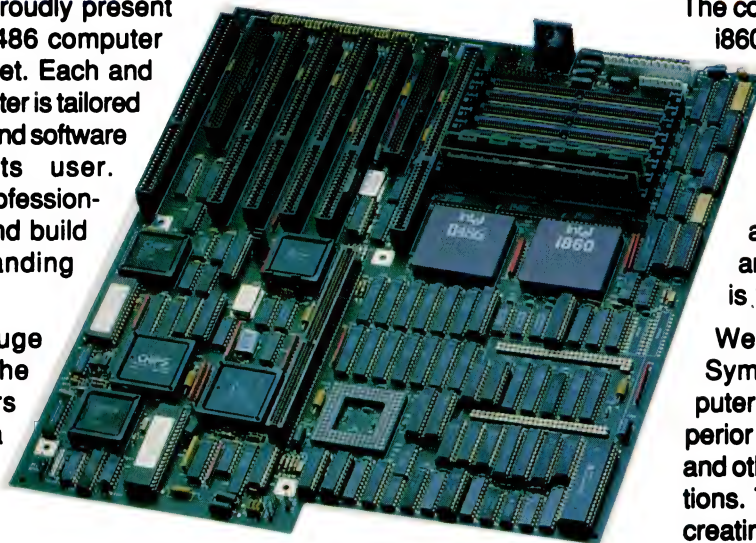
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Office Automation *OA*

are designed for high throughput applications, as would be encountered on a server for a large network. The physical appearance of a printer can also be of some help here – if it looks and feels solidly built then it probably is, and should provide many years of reliable service for multiple users.

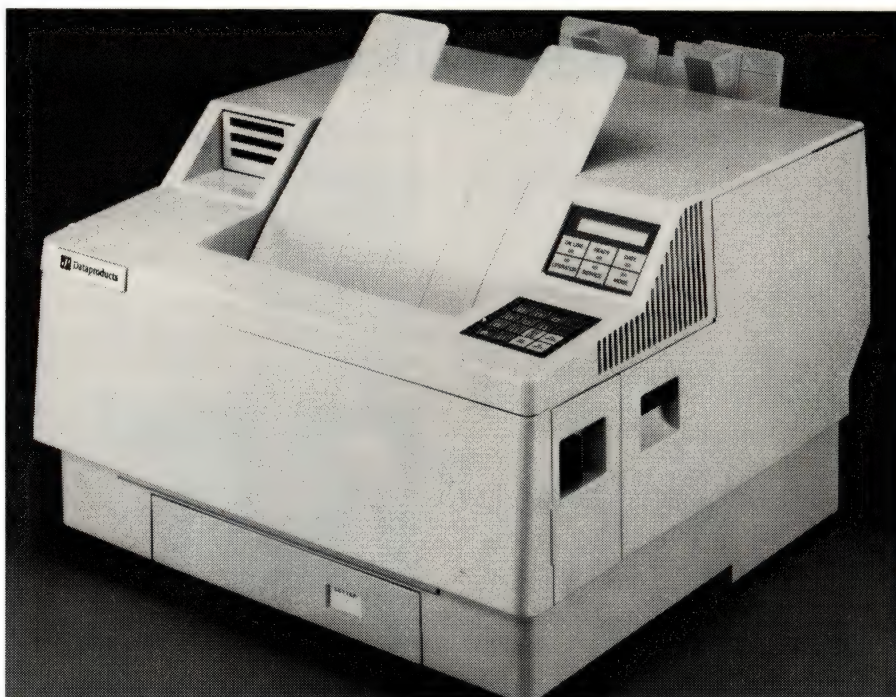
For laser printers, a 4ppm machine should be adequate for a small number of users, depending on the amount of printing which each user usually performs. At the other end of the scale, a 12ppm unit would be wasted on a single computer, and is best utilised on a print server in a network with a reasonably large number of users. Again, the quantity and complexity of the print jobs will determine how many people can comfortably share a printer. Complex pages from a desktop publishing system can be expected to swallow up a far greater share of printer time than simple letters, as you might expect.

Other features to look for on a dot matrix printer are paper parking, where the continuous stationery can be removed from the printer path (without totally unthreading the paper from the printer), to allow single sheets to be fed through for printing. For office applications, also look for options such as a sheet and envelope feeders, to allow multiple letterheads or envelopes to be printed without operator intervention.

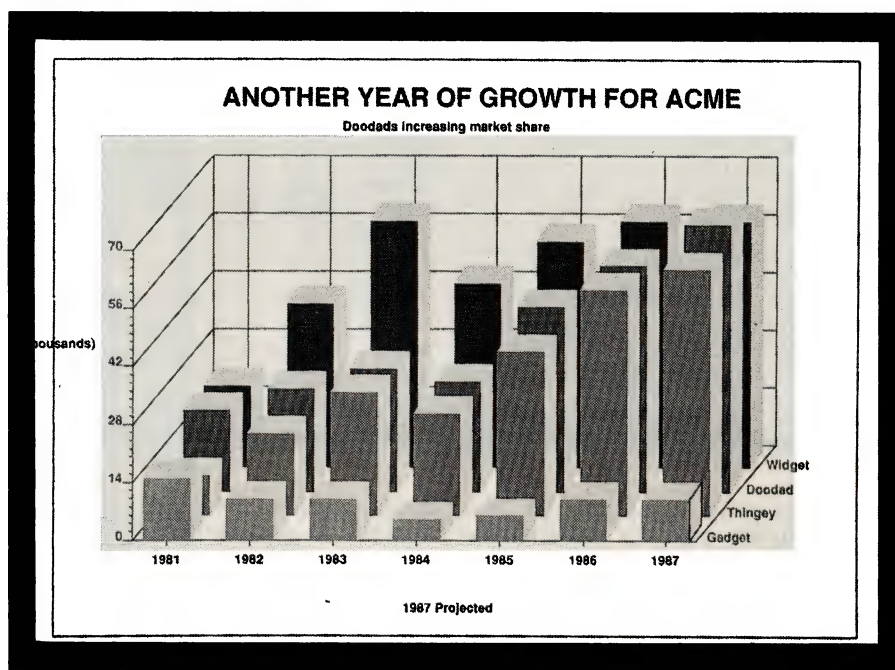
In a laser printer destined for network use, look for features such as dual paper feeders (to allow plain paper and letterheads to be ready on-line at the same time, or to allow one bin to be re-filled while the other is in use), a fast 86020 processor (to speed processing of images), and a parallel port if it is to be connected to a PC-based server. One of the biggest criticisms leveled against the Apple LaserWriter range is the lack of a parallel port. This would be useless for Mac applications, but it means that PCs must use a slow serial port instead of a parallel port running many times faster.

When looking for a shared laser printer for a Mac environment, make sure it has AppleTalk support. This allows several Macs (or even PCs, with an optional card) to share the printer using the inexpensive Apple LocalTalk hardware. Naturally, the Mac range of laser printers supports AppleTalk, but a number of other manufacturers also support it. Up to 31 computers can share a laser printer in this way.

Most printers have a buffer of some sort built-in, although this is often only 2 or 4Kb in size. However, some machines



The Dataproducts LZR 1260i is a typical high-end laser, operating at 12 ppm (other models in the range run at up to 26 ppm!), and includes 4Mb RAM as standard. The 1260sf is similar, but has the PostScript controller in an external box, and includes a 20Mb hard disk. The 1260i is priced at \$9995 (plus tax), while the 1260sf is \$12,950, excluding tax, but that includes the hard disk.



For high quality printing, such as that for company reports, a laser printer is almost the 'standard'. With the right software on the computer, it's a simple matter to include graphics to break up large amounts of text in a report and to include tables and charts for clarity.

Toshiba Office Power

FOR EMPLOYEES of the Melbourne office of the law firm, Sly and Weigall, the arrival of six new PageLaser12 printers from Toshiba meant the end of headaches and sore feet. The days of standing in a queue waiting for the company's old daisy wheel printers to do their work were over. So too were the shouted conversations at the printer stations as the mechanical relics sang out their high-decibel song.

'What we've been able to do, because the Toshiba printers are so quiet, is to put all six lasers in the middle of our office environment,' said Sly and Weigall's consulting MIS manager, Steve Watson. The law firm has a fairly sophisticated Unix-based computer system from STC called Office Power and it needed the printer technology to match.

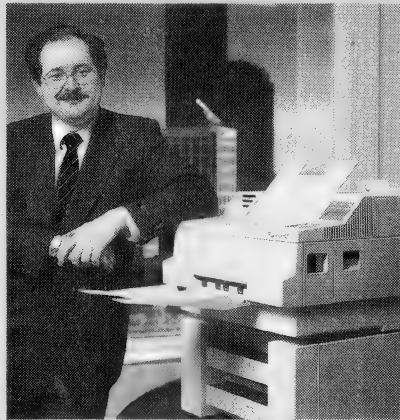
'We had a look and tested a wide range of printers,' said Watson. 'The overall performance of the full 12 pages per minute and the cost of running the PageLaser12 machines made the Toshiba machines look attractive.'

'One of the important features of the PageLaser12 is that it can handle some fairly heavy stock, which is important for us as a legal firm. Many of the other printers couldn't do that.' With the high throughput of work the Toshiba PageLaser12 was experiencing at the Bourke street offices of Sly and Weigall, there was a definite need for a printer which would not constantly be out of action. 'We needed something we could rely on heavily,' Watson noted.

'This means that we needed some good technical backup if anything was to go wrong. Eventually, we found an organisation called Copispec. They had the skilled engineers to help us if we

A Melbourne-based law firm is actually saving on printing costs using laser printers!

were in trouble, and if they couldn't fix the problem in a day or two, they would temporarily replace the printer.'



The company had a number of pre-determined needs which had to be met by a quality laser printer. Toshiba's PageLaser12 fitted the bill in each case. For example, the printer's multiple bin option was economical— we have three bins so we can load in any of the many different types of stationery we use — Steve Watson, Sly and Weigall.

From the user's point of view, the whole process of printing something while using an Office Power terminal is totally transparent. 'We Modified the the back-end of Office Power to enable

all users to access all the features of the Toshiba laser printers in one pass,' he said.

The user would choose what he or she wanted printed out, in what style and so on, execute the task and then wander over to one of the printer stations to collect their work. Each of the six printers was hooked up to one of the three central processors, which were in turn connected to users on an Ethernet local-area network.

Watson commented that the idea at Sly and Weigall was to keep all the more difficult tasks transparent to the users. It's a philosophy all good network managers stick to — keep anything technical away from the users.

Apart from the benefits of ease of use and flexibility, the Toshiba PageLaser12 had something else to offer Sly and Weigall — cost efficiency. The company has made something of a saving on the cost per page of its printing jobs. According to Watson, the Toshiba lasers are producing pages at a 'substantially cheaper rate' than other printers tested by the company. Sly and Weigall is currently printing at a cost of 4.1 cents per page, compared with 9 cents per page with other printers.

Watson is fairly optimistic too about the life span PageLaser12 printers. Toshiba itself estimates the life of the PageLaser12 to be around 600,000 pages. 'I think we'll see the printers in our office stretch well beyond that. We've had one printer here for six months and we've already produced a quarter of a million copies.' And with Sly and Weigall saving 5 cents per page with the PageLaser12, that will be quite a substantial amount 600,000 pages!

have buffers much bigger than this (the NEC P5300 has 80Kb, for example), to allow several pages of text to be sent to the printer as fast as the computer is capable sending them, so the computer can be used for something else while the printer is busy. If this is not enough there is always the option of adding an external buffer. This is especially useful if the printer is expected to have a high graphics throughput — a full-page of bit-image graphics can range up to almost a mega-

byte in size (depending on the resolution), and take several minutes to print.

Before buying a particular printer, be sure to check the availability of replacement ribbons and their cost. A cheap printer is false economy if you have to pay a fortune for special ribbons that have to be especially imported from Japan with a lead-time of 3 months — we've seen replacement ribbons for a \$600 printer priced at \$70 each. Most ribbons come in cassettes, and fabric ribbons can be re-

linked several times before replacing them (if quality is particularly important), for a further cost saving.

There are two ways to connect a printer to the host computer: a parallel or a serial cable. A parallel connection is undoubtedly faster than a serial, and this speed advantage can become important, especially when large amounts of graphical data needs to be sent to the printer. Apple do not support a parallel port on either their Mac computers or any of their print-

PRINTERS

ers, so if you are using one, you're limited to 9600 baud serial throughput.

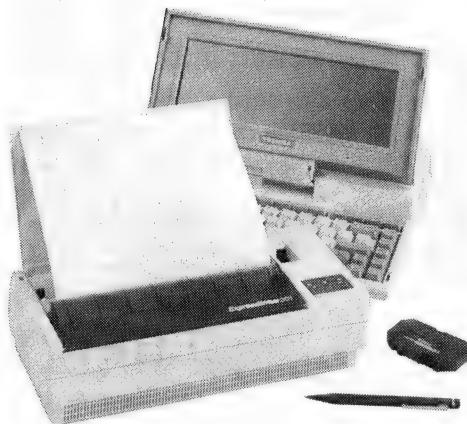
The disadvantage of parallel cabling is that it is limited in length to about 10m, due to the nature of the low voltage signals involved, although signal boosters are available for longer runs. You can share either serial or parallel printers, and most computer dealers have a range of sharers available. These range in simplicity from a box with a mechanical switch in it, to automatic units with built-in buffers. Some of the intelligent sharers allow a mix of serial and parallel computers to work with either a serial or parallel printer.

Maintenance

LIKE ANY mechanical device, regular maintenance of a printer is one of the best ways to prolong its life. At the very least, a visual inspection of the internals is needed whenever you change the paper or replace the ribbon, to ensure that no foreign objects have found their way into the works; and, occasionally vacuum cleaning the inside to remove the paper dust that builds up, particularly from cheap paper. Beyond that, there is not much to do for a dot matrix printer, beyond replacing the

ribbon when it wears out.

However, laser printers are more fussy about regular maintenance than dot matrix printers – when they run out of toner



Printing on the go – Toshiba's ExpressWriter 301 is designed as a companion for laptop computers. Weighing only 1.9kg, it runs from a built-in NiCad battery for one hour of continuous use, and is priced at \$798. Contact Toshiba on (02) 887 3322 for more details.

they really run out; it's not a gradual fade-out like the ribbons in impact printers. In most laser printers, the toner comes in a cartridge with the drum itself. However, the drum usually lasts much longer than the toner supply, so a toner re-charging industry has sprung up virtually overnight. These companies exchange used cartridges for re-charged ones, for significantly less than the cost of a new cartridge, allowing the full life span to be extracted from the drum. However, many who have used such services complain of the print quality with a re-charged drum, so take care if quality is important.

It is a good idea to give a laser printer a clean-out when you replace the toner, or even before it the print quality is noticeably deteriorating. The exact procedure to be followed here depends on the printer model, and instructions are usually included with replacement toner cartridges.

More extensive maintenance or repair work should be left to the experts. The printer manual will state when these services should be undertaken, although a sharp drop in print quality or reliability could mean it is time for a service regardless of the number of pages printed. □

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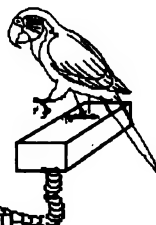
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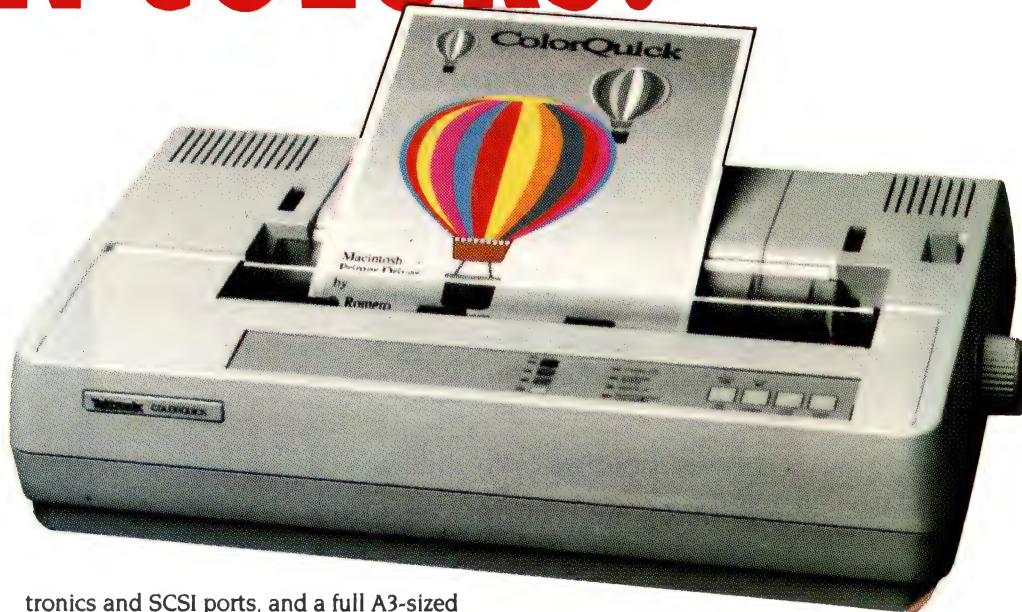
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OVER THE PAGE, Tektronix are giving away a ColorQuick to a *Your Computer* reader. This \$5000, 48-nozzle machine represents the current state-of-the-art for presentation quality color printing and its list of features is the envy of those of us stuck with black – 16.7 million, dithered colors (with a Mac interface), both Cen-



tronics and SCSI ports, and a full A3-sized printing area (297 x 420mm).

The printer driver draws a portion of the picture in memory, then converts the different colours into patterns of the 8 basic, solid colours the ColorQuick uses. The resulting pixel data in CMY format is sent to the printer and this process repeats until all of the picture has been sent.

The ColorQuick has eleven typeface families representing a wide range of fonts including Bitstream, Compugraphic, Altys, Allotype, Monotype and others. The next release of the print driver software (version 1.2) will also support Adobe's type 1 download fonts. For those interested in the Adobe Type Manager (ATM), this application will allow the conversion of Type 1 fonts to bit mapped screen fonts and will permit the ColorQuick to use Adobe-format typefaces in any point size.

The ColorQuick prints with a resolution of 216-dpi and it takes about two minutes for an A4 page to about six minutes for an A3 page, depending on the complexity of the image being printed, the application and the speed of the computer's CPU.

By far the most important question when deciding which colour printer to buy is: 'Will it work with my hardware and software?' The ColorQuick supports Dos applications and is Mac-compatible. In theory any Macintosh application ought to work well on it and most do, but some

applications insist on using PostScript output only – Aldus Illustrator 88 is an example. These do not work with the printer unless it is plugged into the Tektronix Phaser Print Station.

In the past inkjet printers were plagued by reliability problems. As the ink contacts the air, it has a tendency to dry out and clog the tiny nozzles. This problem has been overcome by using automatic maintenance cycles that clean the heads: every five minutes or so you hear a low pitched buzz which is the sound of the maintenance cycles activating itself and flushing drying ink from the print head nozzles.

For best quality output the ColorQuick inkjet requires special paper. Bond paper may be useful for previews but the water-based ink tends to smudge on it. Transparencies also need to be specially coated to absorb the ink. These special papers, special transparency film and special inks add to the running costs of the printer, but overall running costs average about 25 cents per page.

If you'd like to know more about the ColorQuick – see our color printer feature next month (or better yet, enter the competition for a chance at some hands-on experience)! In the meantime, contact Tektronix by phone on (02) 888 7066, or by fax, (02) 888 0125. □

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Please answer the following questions about the Tektronix ColorQuick printer.

- Q1: What printing technology is used?**
- Q2: Name the colours of the inks?**
- Q3: What is the print resolution in dots per inch?**
- Q4: Can a full tabloid page be printed?**
- Q5: Which software best matches colour between display and printer?**



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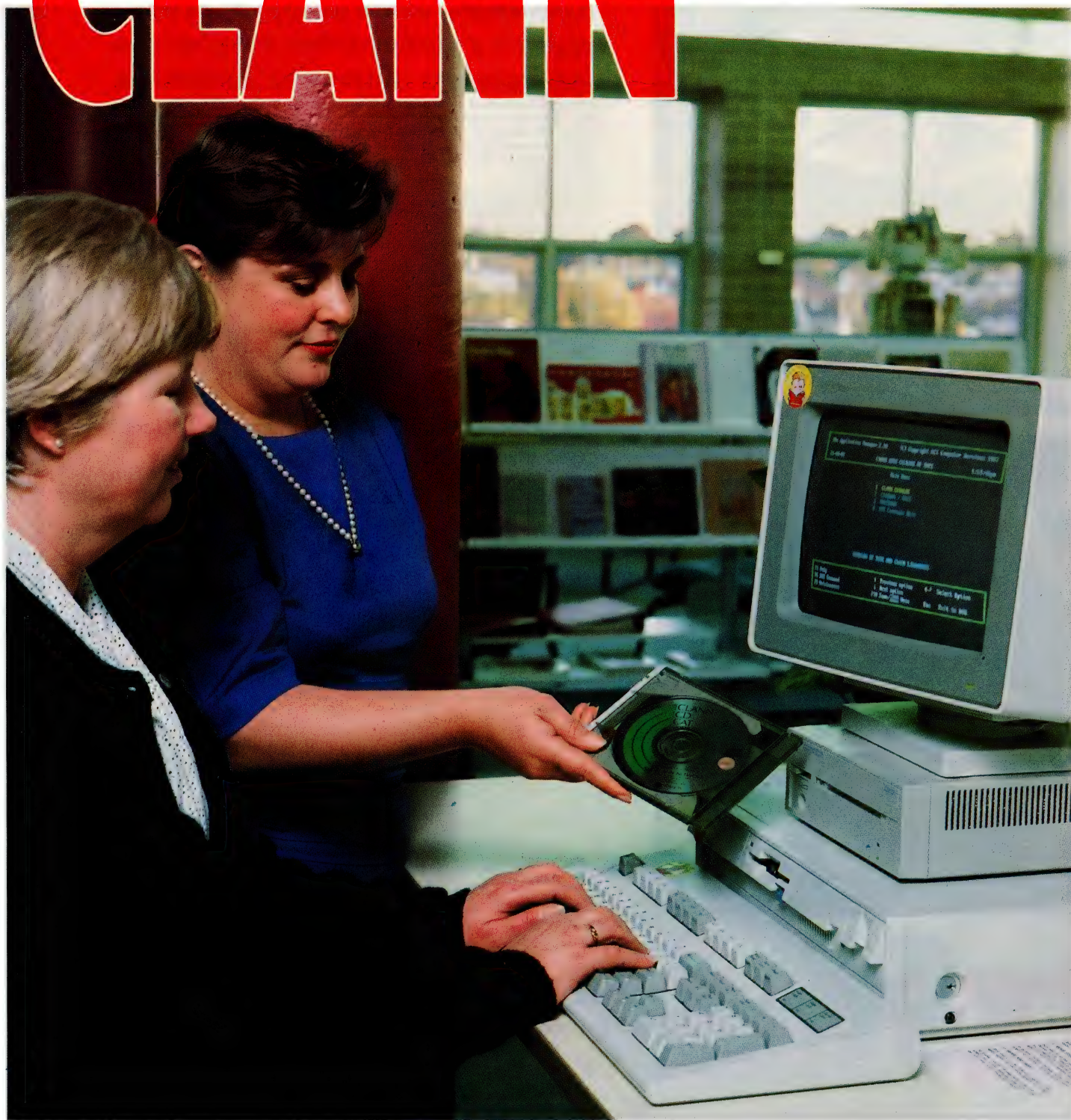
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GATHERING OF THE CLANN

Jillian Hamilton catalogs
an application for CDs in
libraries . . .



YOU CAN'T ACTUALLY say that CD-ROMs have revolutionised personal computing yet, but there's a slow, steady insinuation of these little silver data platters into our computing lives. Optical write-once and erasable-recordable disks are now a practical proposition, so it may not be long before we sing 'every disk has a silver lining!'

The potential of the laser-powered optical disk for the storage of data has been apparent since Philips developed the videodisk back in 1972. Ten years later, Philips followed this up with the world-wide audio CD (compact disk) standard, and CD-ROM a few years later still. It is extraordinary that this remarkable series of technical innovations all flowed from the one company.

World-wide there are now thousands of CD-ROM 'applications' available off-the-shelf or by subscription, and in Australia you could probably now find at least a hundred. There's not too many one-off sales of disks however – subscription seems to be the path that appeals to most CD-ROM publishers. You pay big money, but in return you get regular updates as the information changes.

Until now, the main problem in publishing a CD-ROM disk was in getting together enough desirable data to justify the disk mastering expense – you've got between 550- and 660Mb to fill (if you take it right out to the edge) which is more than a fast typist can type in a life-time, so most Australian-made disks have held corporate records and illustrated manuals for in-house use.

Internationally, the existing online databases were a ready source of data of the required multi-megabyte dimensions. So it isn't surprising to find that you can buy a CD-ROM subscription version of many major online databases nowadays, complete with millions of abstracts of reports and articles. Each disk set will cost you a couple of thousand dollars – but this fee gives you three or four updates a year, so it is economical for universities and corporate researchers.

Australian research organisations like the CSIRO get substantial financial benefits from being able to search current abstract databases (mostly from the USA and UK) without international telecommunications costs. Telecom's Austpac and OTC's Data Access packet-switching links would, between them, often account for half the overall search expense.

Researchers also prefer CD-ROM over online searching because they can browse

through the disk casually, taking as long as they wish, with no by-the-second usage charges, and therefore, no pressure to find data quickly and purposefully. The serendipity value is important in all forms of research, and large organisations also benefit from paying only a one-shot charge for any number of casual users.

But, with the exception of a couple of Bureau of Statistics databases, and a few legal ones put out by CLIRS (now Info-One International), most of the general CD-ROM research disks used in Australia are published overseas. However, that's gradually changing, and with Melbourne's Disctronics now one of the world's foremost CD disk manufacturers, there's added incentive for Australian companies to begin exporting information through this technology.

Clann

ONE OF THE more interesting recent applications of CD-ROM has been produced by an Australian co-operative library group known as Clann. The acronym used to mean something, but now its origins appears to be lost in the midst of time – 'It's just Clann now!' I was assured when I asked...

Clann provide a catalog and inter-library exchange service for a large number of the smaller (and a few larger) specialised and general libraries in New South Wales and Canberra. Its members include Sydney's University of Technology and the Australian National Gallery library, but also some of the smaller agricultural colleges and local council libraries.

The idea behind Clann was that all these libraries would share the laborious work of cataloging new books and audiovisual materials, and enter these 'citations' online into the network mainframe. In turn, each library could have front-desk online terminals with OPAC (On-Line Public Access Catalog) available for staff and library users.

They could access and search for material held both in their own library, and in the library exchange network as a whole. Extra facilities are built-in to help the user chase down specific items; for instance, OPAC can tell you if a certain book is available, or out on loan.

OPAC worked fine with a limited number of medium-sized libraries all located in reasonable proximity to the mainframe – but how do you provide such a service to a part-time council library in the 'back o' Bourke' or a high school library near Albury?

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Clann standardised on the Philips half-height CD-ROM drives, largely because of their fool-proof and tamper-proof operation in public areas.

There are now more than a 100 libraries in the Clann network, and the cost of maintaining online links for occasional users is prohibitive. Recently, the online system has been reaching the limit of its capacity due to the increasing load of cataloging.

CD-ROM was the answer, and producing a disk version of the inter-library catalog also meant that the service could be made available to interested researchers outside the library system. Private research groups or small companies can afford to subscribe to the Clann disk service for occasional use, and they'll probably use their CD-ROM drive for numerous other applications as well.

Joanne Parkes, the special projects manager at Clann, took overall responsibility for the CD-ROM project. 'We saw CD-ROM as a complement to OPAC, and as an alternative to microfiche. Disks are better than microfiche because they can use the PC's power to conduct the search for you.'

The search engine used on the Clann

disk was Fulcrum Fulltext, a Canadian OEM retrieval package widely used around the world for both disk and online systems. 'Both Info-One who designed our disk, and Philips who make the disk drives, advised us to use Fulcrum. It gives us full Boolean operations in our searching (AND, OR, NOT), and we've made a slight adaptation to provide easy-keyword searches.'

Clann standardised on (and bulk-purchased) the Philips half-height CD-ROM drives, largely because the drives gave fool-proof and tamper-proof operations in public areas where supervision is impossible. Philips invented CD-Audio and CD-ROM, and they've obviously given a lot of thought to the problems that public-access would create with large disk-based information systems.

As a result of their analysis, Philips enclosed their disk in a special plastic caddy which must be inserted into the machine and then removed before the machine can play. This protects the disks from damage, but at the same time library users can't

eject (and possibly steal or damage) disks without having a caddy – there is no eject button.

At present, there are nearly 150 Philips drives attached to an assortment of AT-level PCs around the Clann library network, and the system is popular with librarians and users.

'We haven't really had any problems at all. We had a lot of discussion during the planning stages – we were the first in Australia to do this so we didn't have anyone on whom to call for advice, but generally the whole process flowed along quite easily.'

Patrick Robles of Info-One who handled the pre-production stages, concurs. From start to finish, it is a totally Australian product, and so far the process has run smoothly although there has been a lot of learning, and a lot of work involved.

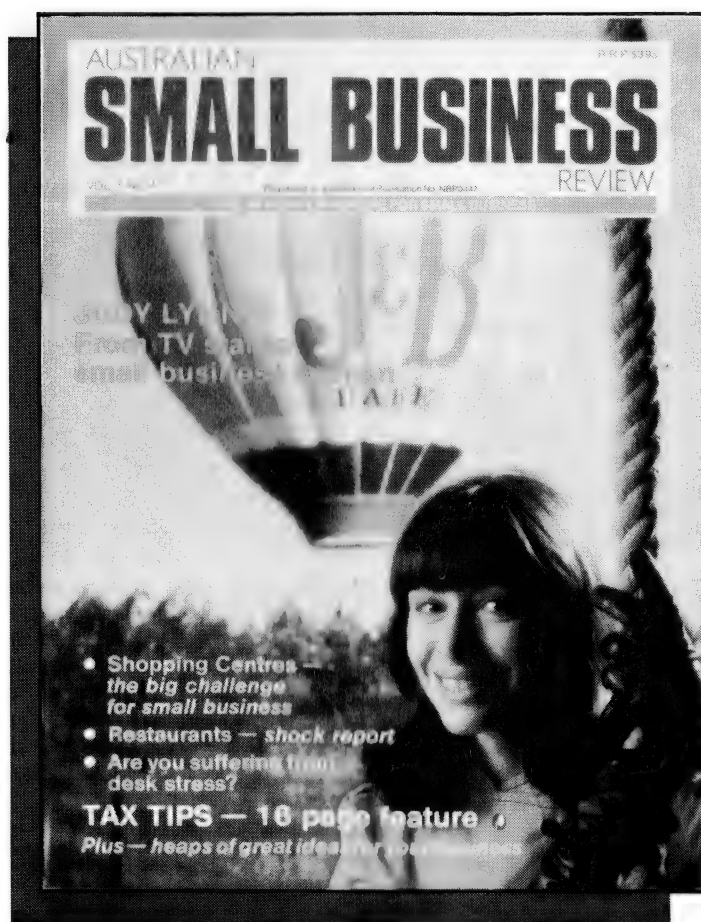
Every quarter, Clann sends him a full copy of the OPAC database, and he runs it through a filter program to get rid of unnecessary fields – fields which show book-borrowing and special librarian's cataloging data. Then, the remaining database is indexed in full – every word – with the exception of the standard conjunctions – etc., and, or, but, not, on, of, in, the, by.

Info-One also added some 'string-searching' code to handle Title, Author and Subject fields, which allows users to speed up the search process. As Robles explained, 'When you know what you want you can use the faster string-search, but when you are a little more vague you've got the full-text index.' They also wrote some special software to handle the full set of European characters – pound-signs, accents, graves, and so on – which librarians need to handle the growing range of foreign books.

'Then we have to restructure the mainframe's data format to suit the requirements of the disk and the slower speed of PCs, and in the process we cut back the 800Mb mainframe database to about 500Mb on the disk. This is still a lot of data for a PC to handle at a reasonable search rate, so we had to do some clever tricks to make it work as well as it does.'

Overall, this one disk is holding 8 years of cataloging effort from the 100-odd libraries in the Clann network, and it still has space to spare. It will be another few years before they need to move to a twin-disk set. 'Based on our current calculations, we can probably fit about 1.2 million citations (records) on the one disk with all the indexing and overheads.' □

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HEBREW QUIZ

SOMEONE ONCE GAVE my son a computer game that he enjoyed playing very much. Indeed it was one of the very few of the great many games he has that he put on the hard disk. However, there was a bug (apparently not a virus) in the disk that he obtained. In due course, at some point in the game, the screen would go blank and he would be forced to reboot. Since this would sometimes happen just at an exciting point of the game, it was a source of much frustration. Eventually, he became so exasperated and annoyed that he deleted the program from the hard disk and formatted the floppy so that he would have nothing more to do with this game again.

I am reminded of this, because my version of the Hebrew Quiz has a bug which at some point says 'error No.63' and goes back to the A> prompt. While the situation is not as bad as with my son's game, since not all options of the Hebrew Quiz seem to run into the bug and one does not have to reboot, simply type Hebrew again and start all over, the annoyance factor should not be under-estimated.

Options

THE DISK SEEMS to have an almost infinite, and certainly a bewildering number of options. Indeed, I undertook to review Hebrew Quiz ten months ago but initially felt that before I could properly do so, I must explore all the options. I now realise that there are far too many options for me to actually go through all of them. I can therefore describe only some of the possibilities that exist in utilising this Hebrew Quiz program.

For example, if option two is selected at the opening menu (and there are six different possibilities), you are asked to indicate which chapters of the book by Lambdin (Thomas O. Lambdin's *Introduction to Biblical Hebrew*) you want to deal with.

AMSEC

This review was prepared for AMSEC, the Software Evaluation Centre, by Professor Bert Mond of La Trobe University. AMSEC is an Australian software evaluation group with consultants in the workplace, in schools and in tertiary institutions around Australia. It can be contacted at PO Box 140 Hurstbridge 3099 Victoria or PO Box 1339, Armidale 2350 NSW.

As Bert Mond reports, this public domain Hebrew tutor reinforces Hebrew vocabulary rather than teach it from scratch.

(Since I do not have the book, I do not know how many chapters it has, and hence, how many possible variations this choice includes.) You are then invited to select some or all of a list of ten categories of words that are to be included. These ten categories are nouns, pronouns, verbs, adjectives, prepositions, adverbs, conjunctions, names, particles and/or numbers. At this stage, there is a choice between reviewing the words first or going straight into the quiz. I suggest going through the review first to see how the

The disk seems to have an almost infinite, and certainly a bewildering number of options.

system works and what form of an answer is acceptable. You may find that even if you know the meaning of a word, you are not giving the answer in the way the program will accept it. The program keeps a count of the number of correct and incorrect answers, the appropriate percentage of correct answers, and the number of questions that remain to be asked. If you answer a question incorrectly, that question is repeated until you get it right.

Option four involves frequency lists. By this it means words that appear with a certain frequency in the Hebrew Bible. You indicate the frequency (minimum and maximum) you are interested in and, as well, choose from the ten categories listed, the type of words you wish to be included. Finally, in option six, the computer is allowed to choose the option for you.

There is one option that is not devoted to vocabulary (or verb conjugation). This

is the Order-of-Alphabet program – option one. Its point is to teach you the order of the Hebrew Alphabet. After you indicate how much time you want to spend on this, Hebrew letters appear two at a time. By pressing the appropriate key, you answer which comes first. It can also be arranged so that you are answering the question, which comes last.

As indicated, most of the rest of the program is devoted to teaching and quizzing on vocabulary. One can select which chapters of the book the words should come from. Or, you can choose to be quizzed on nouns, adjectives, verbs, and so on, or even words that appear frequently in the Hebrew Bible, or deal with complicated verb forms. Indeed, the very great number of possibilities that are presented at each step gives the participant maximum flexibility in what he wishes to learn and be quizzed on. Personally, however, I feel that continually presenting a wide variety of choices can be overdone. It should be clear that where there are ten different categories of words that might be included in the vocabulary to be tested, one can choose a single or any number of these different classes.

Thus, ten distinct categories means 1023 different possible choices. Each of these choices then requires further choices as one proceeds. When studying from a textbook, the reader certainly has the option of going to any page or chapter at any time. On the other hand, the author must present his material in a consistent and reasonably developed way so that the average reader will be able to follow the normal progression and not have at, say, each half page to decide 'now where do I go from here?' I would like to see a program teaching Hebrew but with the same philosophy, that is, a progression from easier to more difficult material, rather than presenting the maximum number of possible choices at each step. □

Product Details

Product: Hebrew Quiz,
PC-SIG Disk 902
Distributor: Manacomm Pty Ltd
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AEG **OLYMPIA**

COLORING THE 1990s

THE COMPUTER industry is going through a period of dramatic change. The new decade brings with it a new generation of color computing based on powerful desktop computers with sophisticated color printers and colorful application programs. Some time during the next decade we will all make the transition to color computing. Applications used for illustration, graphic design CAD and desktop publishing will lead the way. Everyday software will follow this lead adding color font selection and commands to their range of formatting tools, and as a result, we will start using those normal color conventions that are so much a part of everyday life.

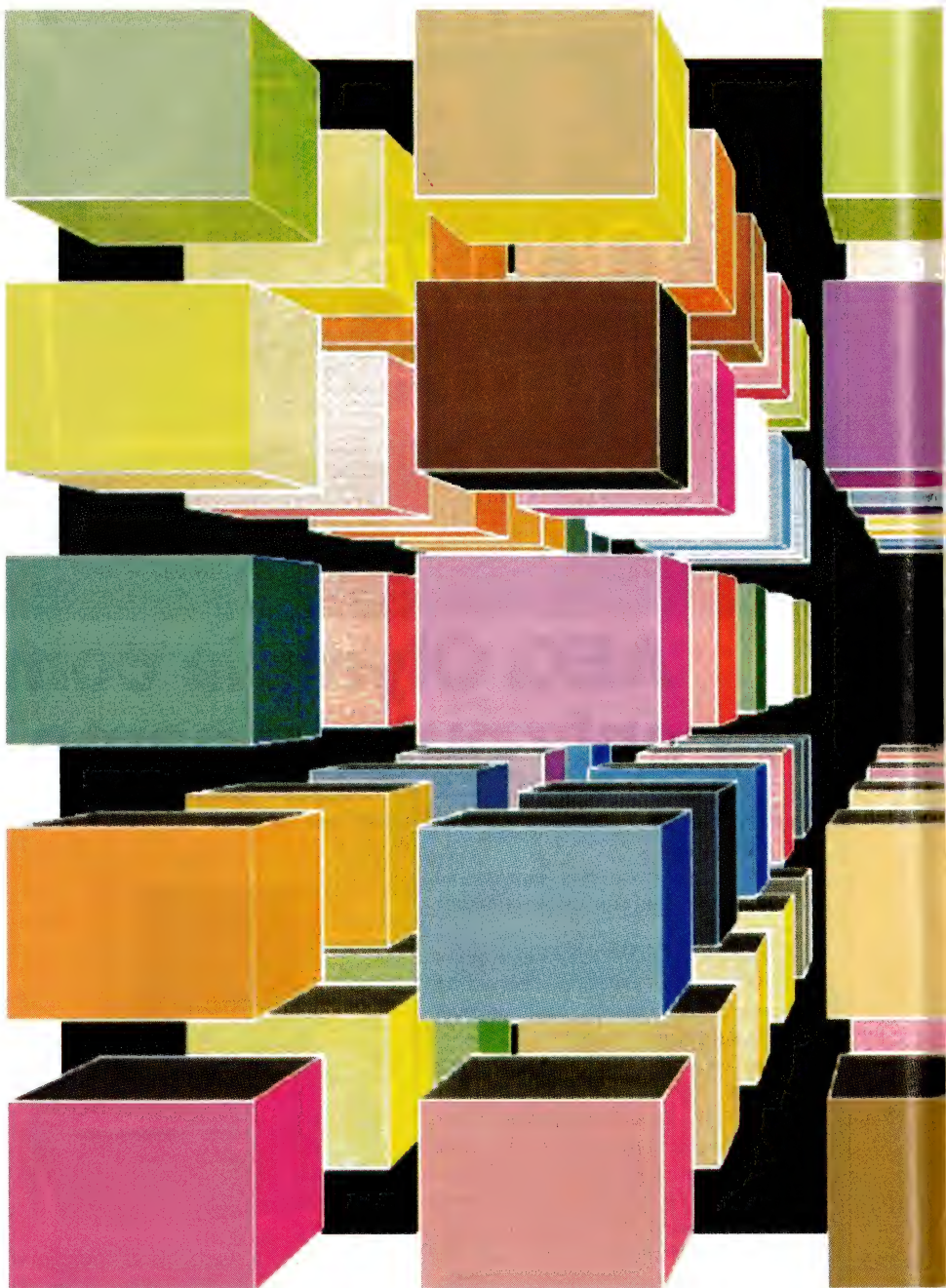
When we use color on our computer system we will want to be able to: easily specify, edit, manipulate and match colors; print the colors selected on a color printer and have them look the same as they appeared on the screen; and accurately communicate colors selected on the computer screen to a printing device or another person.

Although a number of color specification systems have been developed over the years, none of them provided the ability to consistently translate human definitions of color into a mathematical model that computers and output devices could understand. These color specification systems were developed when color applications and graphics systems were far less sophisticated than they are today and when our understanding of how people perceive color was more rudimentary.

Despite that, the systems – the RGB and HLS color spaces and their variants – have served users well. But as computer systems improve in their abilities to display color, the complexity of tasks being performed on those systems increases. The older color models lack the colorimetric precision and visual uniformity required by today's users. In addition, neither RGB nor HLS are related to an internationally accepted color standard. This makes it extremely difficult to define and control color appearance with these systems, because there is no way to equate color designations in either system with objective specifications.

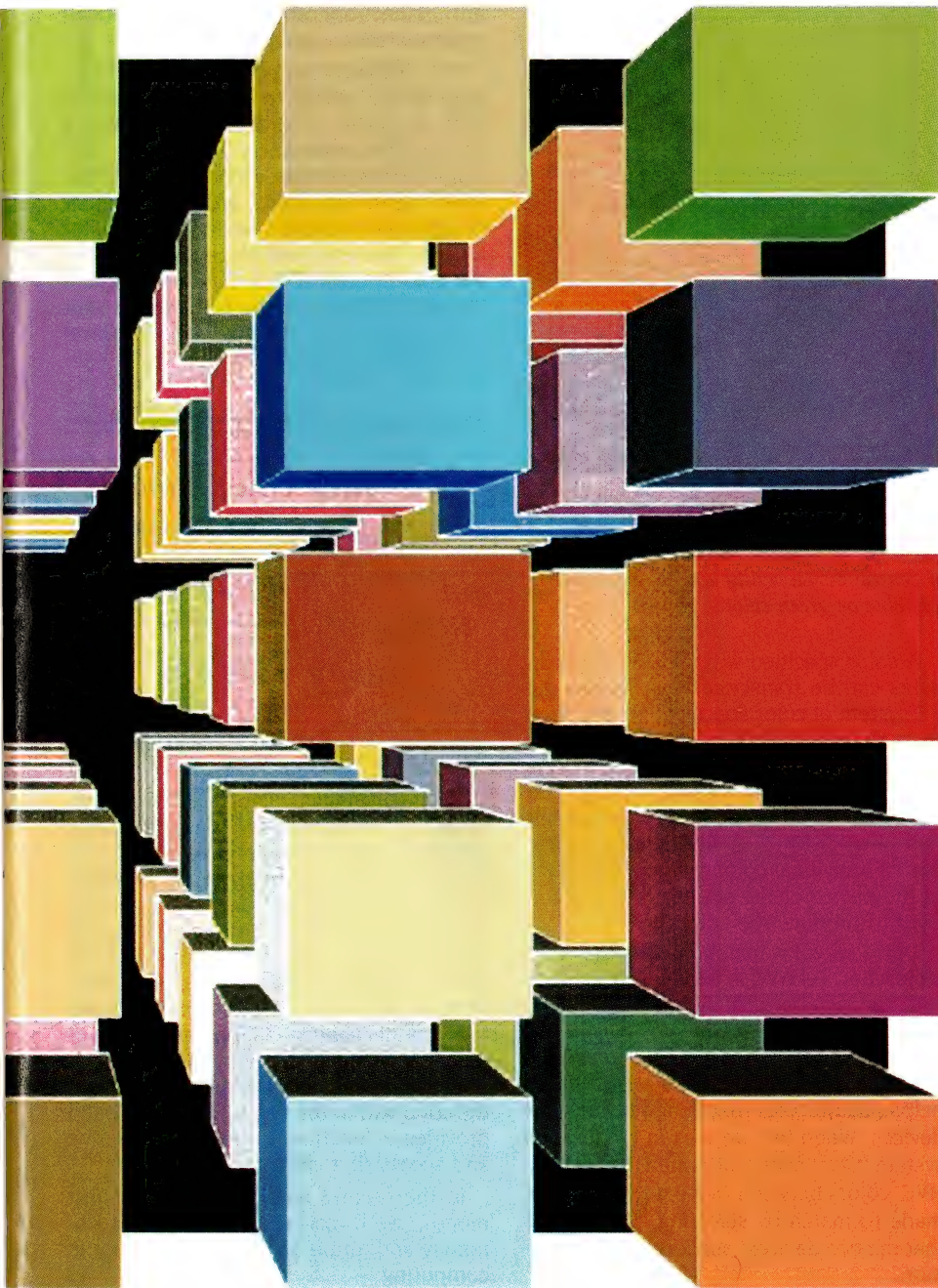
Device-independent color

IN DEVELOPING a true device-independent color model, Tektronix chose to link its color system to the colorimetric system outlined by the CEI (*Commission Internationale de l'Eclairage* or International Com-



Part 1-Defining color for computers

What is 'color' and how do you define a color that is device independent? That was the problem that faced Australia's Tektronix – Pierre Cochrane reports on the solution.



mission on Illumination). The CIE system consists of a series of essential standards, mathematical definitions and the measurement procedures that are necessary to make colorimetry a useful tool for science and industry. The 1931 CE Chromaticity Diagram was the first diagram accepted internationally for general use.

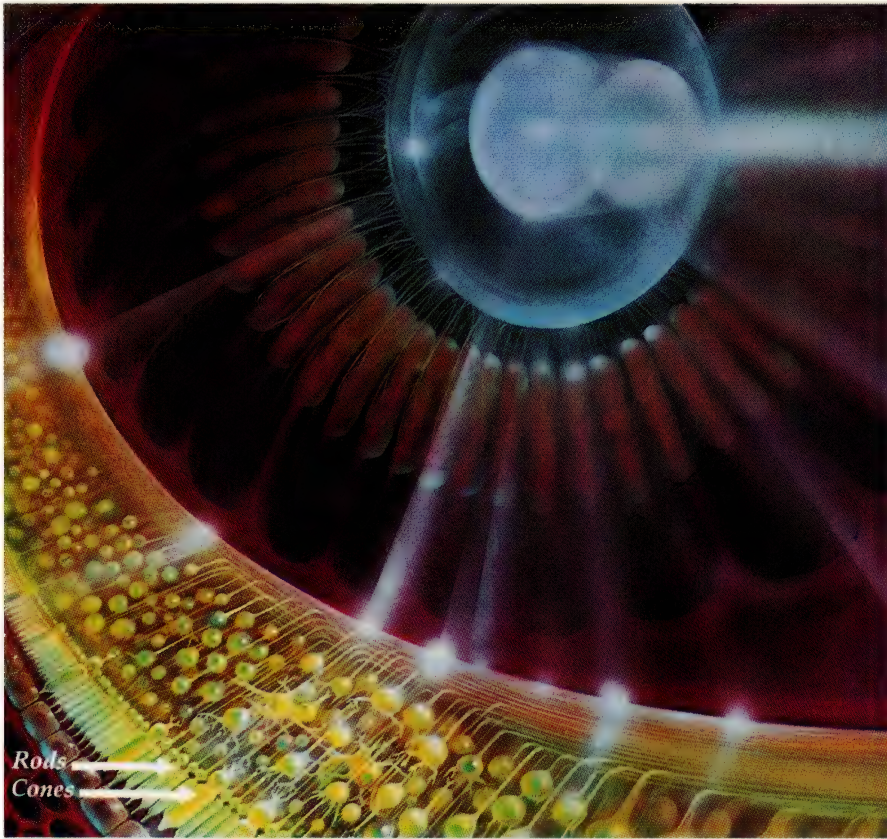
Updated in 1976, the diagram represents all recognisable colors within its boundaries and serves as the basis for the CIELW color space which models human color vision. Until the development of TekHVC (hue/value/chroma), the CIELUV system was the best available approximation to a visually uniform color space. It supplies an objective means of defining color and forms the basis for an international standard. The CIELUV system is used by color scientists world-wide.

The TekHVC color space is a set of algorithms that creates a three-dimensional color space for a graphics device. The color space is represented by a visually uniform color model representing all visible colors. The model is represented physically as an irregularly shaped solid. The solid is a complex shape with the lightness extremes of black and white located at its 'poles' and the full-intensity pure hues located at the points around its circumference furthest from its axis. All colors visible to humans are represented within the confines of this color space.

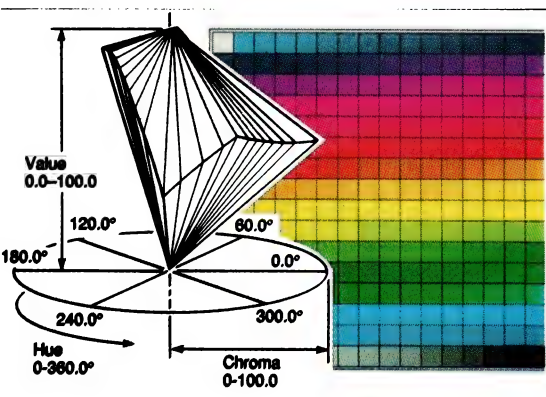
The color space handles all interaction between the user and the devices of the computer system, using transforms to output RGB (red/green/blue) values to the display monitor and receive RGB values from it. The color space also outputs CMY (cyan/magenta/yellow) to the printer and receives CMY to HVC transforms. From the user's perspective, all color-related actions are performed in the HVC color space; all translation from HVC to other device color domains is transparent.

Colors are specified in terms of three visually based parameters: hue, value and chroma. The hue of a color is the color family or color name; value describes the variation in lightness from black to white; chroma describes the saturation or vibrancy of a color.

A color defined with TekHVC co-ordinates will have the same colorimetric definition no matter how it is created. Colours defined with the TekHVC system are truly device-independent, and co-ordinates are precise color specifications. Given the appropriate illumination and no influence of surrounding colors, colors with the same HVC values imaged on different devices will appear to match.



In the human eye, the retina contains two general types of photoreceptors: rods and cones. There are over 100 million rods and about 6.5 million cones in each retina. Rods function in reduced levels of light and are responsible for peripheral vision. Cones function at brighter levels and are responsible for central visual acuity and color vision. There are three types of cones – each reacts to red, blue or green color.



Developed by Tektronix, the TekHVC (hue/value/chroma) model gives an objective definition of color. In the model, hue is designated as an angle ranging from 0 to 359 degrees around the polar axis. Values range from 0 (black) to 100 (white) and are plotted along the central axis. Chroma, also scaled from 0 to 100, radiates out perpendicularly from the central axis.

A color specified with TekHVC co-ordinates can be translated directly into the CE system of color specification and from there to any other color system, including the Munsell color system, the Pantone Matching System (PMS)-M, NCSTM and DIN. TekHVC provides an objective definition of color which permits the specification of individual colors without reference to the device or the set of primary colors used to produce the colors.

Optional color matching becomes possible when TekHVC is used in conjunction with device characterisation and calibration. Device characterisation allows the user to produce accurate color specifications for a given device, and calibration helps ensure color matching between like devices. When two devices in a computer system have been calibrated under TekHVC, colors between those devices can be made to match by selecting co-ordinates that the two devices' subsets have in common.

Color matching

BECAUSE TEK HVC allows users to generate display colors for a variety of illuminating and observer conditions, it provides the capability for generating the best possible conditional color matches. A conditional color match is one in which two colors appear to be close matches under a limited set of illuminating and viewing conditions. Conditional matches are the ones most often made in color-dependent industries, because available raw materials vary widely and making invariant (spectrophotometrically identical) color matches is costly.

The TekColor System will match reachable screen colors to a printer provided that a screen characterisation and a printer characterisation are in the TekColor Device Database (TCDD). An initial set of device databases and transform algorithms is included with the TekColor System. The user will place the appropriate data in the TCDD folder and this data is used to transform the color signal sent to the printer into the appropriate printer color signal to match the screen.

The older color models lack the colorimetric precision and visual uniformity required by today's users.

Whether users are professional graphic artists and designers who understand the problems of color matching, or non-artists who still require printer output to match screen colors, TekColor is the color model of choice. It is the tool that enables computer graphics users to communicate color information from one color specification system to another and still maintain color integrity. TekColor enhances users' concept of a color's general appearance, assists in the visualisation of the color within the system framework and provides a functional means to describe and access that color.

In the second part of this article next month, we'll cover color printer technology and future applications of color in computing. □

A HARDIE SECRETARIAL SOLUTION

IN THE HEAD office of James Hardie in Parramatta, part of the Building Boards Division has replaced a mini-based word processing network with Olivetti ETV secretarial workstations. The ETV 3000s run MS-Dos and comprise, in the one unit, a processor with hard disk and floppy disk drive, detachable keyboard, video screen and letter quality printer.

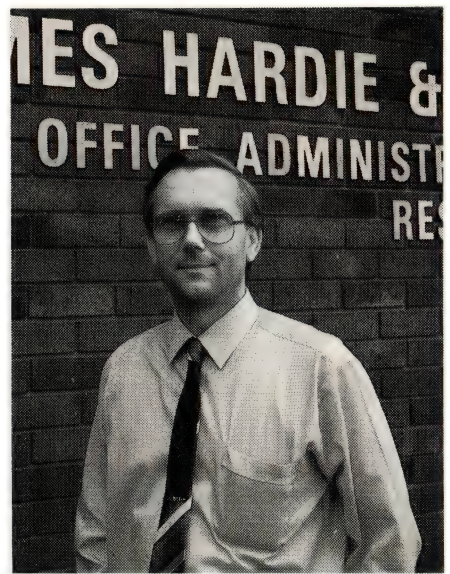
In addition to operating as a stand-alone workstation, the ETV 3000 can run word processing and industry-standard PC applications, function as a terminal to mini and mainframe computers, as well as operating as a typewriter.

Richard Stanford, management information services manager at James Hardie,

James Hardie found the solution to their secretarial work with Olivetti . . .

said the company decided to move away from a system that involved staff using a variety of equipment during the course of their day's work, including a mini-based word processor, a personal computer and a typewriter.

'Now, in most cases, one Olivetti machine replaces up to three different pieces of equipment, which means that staff only have to be trained on one system. Plus,



Just looking at the smile on the secretaries' faces is enough to tell you that having one machine to do everything is an answer to their dreams' - Richard Stanton, James Hardie MIS manager.

the secretary's desk is a lot less cluttered! Ten secretaries are using the Olivetti systems throughout administration, marketing and accounting departments, for tasks such as payroll, personnel administration, work processing, spreadsheets and other applications.

'Some applications require access to our international network where eight 50 series Prime minicomputers are linked. In these cases the ETVs can be used as a terminal.'

The ETV 3000 has a 40Mb hard disk (which can store up to 20,000 pages of text) with a 3.5-inch floppy disk drive, a 10MHz processor with 768Kb of RAM and a slot for half size boards such as those for modems, LAN, fax or EGA video controllers. It will also support an expansion box for full-sized boards, an automatic sheet feeder and continuous form feeder.

When Hardie purchased the equipment recently from Easykey (an Olivetti dealer) it ran a three-day, in-house training course where staff were provided with a comprehensive run-down on the ETV's operation and features.

'We believe the move we have taken will set a trend for other branch, or departmental managers, who may not have considered such equipment in the past. From our point of view, it was purely a 'logical and sensible' business decision. Just looking at the smile on the secretaries' faces is enough to tell you that having one machine to do everything is an answer to their dreams,' enthused Stanford. □



Designed with secretaries in mind, the Olivetti ETV 3000 features a typewriter style keyboard with specific functions keys for wordprocessing tasks (centre and move text and footnotes, for example) and a high quality printer that can also function as a typewriter. The system is priced at \$6990 (including monitor arm) with a 40Mb hard disk; a similar dual floppy drive model is priced at \$5952 (tax included in both prices).

MAC-WORD POWER

WRITENOW AND WORDPERFECT

In the last of our three-part evaluation of Macintosh wordprocessors, Stewart Fist considers two older programs that have recently been revamped and re-released.

WRITENOW IS ACTUALLY a Steve Jobs product owned by his new company NeXT, although sold under the T/Maker label. As you would expect from having Jobs at the helm, it is an excellent Macintosh word processor, but at the basic MacWrite-end of the market. The version I tested was 2.0.

Of the six Macintosh wordprocessors that I've reviewed in the last couple of months, WriteNow is the only one that works comfortably on floppy disks. They've actually managed to keep the basic program down to 102K, and together with a 108K 50,000 word dictionary, it can still fit on a single 400K 3.5-inch disk. Contrast that with FullWrite Professional which needs a hard disk drive and a couple of megabytes of memory. But, as you would expect, you won't get all of FullWrite's semi-desktop publishing features here either.

WriteNow is a good basic word processor that doesn't pretend to be anything else, and as such, it is hard to review it in depth – mainly because it doesn't have too much depth, unless you want to be bored by descriptions about what you'll find on the Edit and File menus. So let's assume all the standard stuff. (Yes, it does have a ruler, tabs, cut, copy, paste, find/replace, and a spelling checker.) If it didn't do all these things it wouldn't be on the market, so let's just look at some of the more interesting features and probe for quirks of the program.

First the highlighting functions. A double click on a word highlights that word (this is now a Mac interface standard) but with WriteNow this process also triggers an intelligent Cut and Paste function which saves a lot of mucking around. This may appear to be mundane, but I think these things are important because they save a lot of time.

When you highlight a word this way and then Cut, the program checks to see that you leave only one space between the words remaining, and if you haven't, it makes the adjustment for you. Furthermore, when you Paste that word back into another phrase, the

program checks again to see that one space (and one space only) was left either side.

Actually, the intelligence goes even further. They've taught it to recognise punctuation marks like full-stops and commas, and it will remove both the highlighted word and the leading space if the word is followed by punctuation. This intelligence is only applied when you double-click a word, however, if you highlight by dragging, WriteNow only cuts exactly what you select.

The ruler in WriteNow looks reasonably standard, but it has a couple of nice features. The ruler is actually a separate window that sits at the top of the page, behind the document(s). You bring it forward, like any window, by clicking on it.

Each paragraph has its own ruler and settings, but new paragraphs take on all formats of the previous one unless you choose to highlight and make deliberate changes to a paragraph. Any time you wish to apply changes to a paragraph, you can select the ruler by clicking on it, and the program will highlight the last paragraph that you were working on – nothing could be simpler.

A couple of recent wordprocessors have used this system of inserted paragraph rulers, but usually, they've cluttered up their screen with embedded rulers across the width of the document, or with little ruler icons on one side. When you see how well WriteNow works, you've got to wonder why?

The top ruler simply shows you the format-settings of whichever paragraph you are working on, and since the ruler has its own distinct window, you can cut, copy or paste rulers into the body of the text just as you could with words or graphics. Dead simple and very effective!

The cleverness of WriteNow

THE CLEVERNESS IN WriteNow shows up here in a couple of ways. For instance, if you copy a paragraph from a document with one ruler width and paste it into a document with another width, WriteNow scales any margins, indentations, and tab settings so

that they look the same with the new ruler format. All these format changes are adjusted relatively. You can also activate the relative-change function deliberately if you wish by holding down the Open Apple key at the time you make ruler changes (that is, widen the margin).

Moreover, if you have copied a special ruler format and pasted it into a document in a number of places, you can simultaneously change all of these 'identical' formats by holding down the Shift key when you make a ruler change to the first. This is a form of 'hot-linking' where copied and pasted paragraph formatting remains linked back to a common source, so a change made to one ripples through all identical rulers in the document.

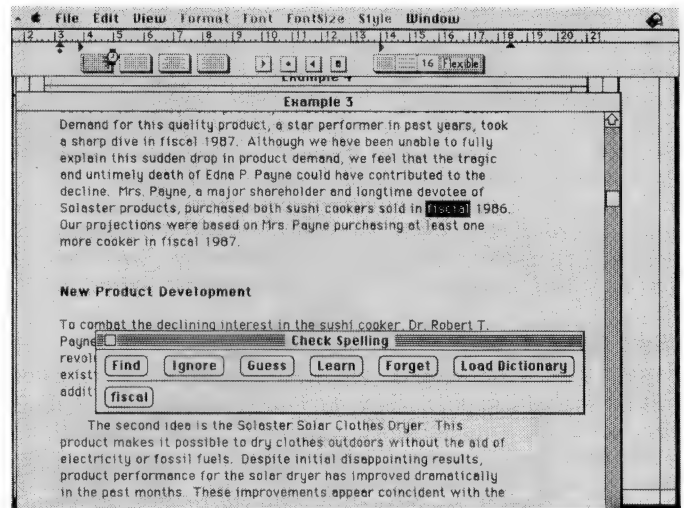
WriteNow also treats Headers, Footers, and Footnotes through distinct windows, just like the rulers – but in the opposite way. What I mean is this: the ruler is a window that you normally see on the screen but doesn't print while the windows with footers, headers and footnotes are normally hidden while you write, however, they do appear on the page during the printing process.

In order to handle these changes, WriteNow has a View menu which (among other things) allows you to see your header, footer or footnote as a separate window. Header and footer windows are virtually full-text word-processing windows with their own ruler.

The only difference between them and a document is that they are limited to only four lines deep – so you can type in material, centre it, justify it right or left (or left on even pages, and right on odd), change font size or style, and so on. Footnote windows are only one line in depth and they default to a smaller type-size. This approach to ancillary material is excellent and very flexible.

You can create two different footer windows, one which will be applied only to odd-numbered pages and the other to the even pages. You can also add any range of variables – page number, time, date and footnote number which increments automatically.

In the direction of desktop publishing, WriteNow doesn't really compete with Word 4.0 or FullWrite Professional, but it does show a couple of features that would have been labeled as desktop publishing a few years ago. For a start, it allows up to four columns, and you can add pictures from MacPaint, MacDraw, Mac-



WriteNow's spelling checker is fast but fairly basic. Find initiates the checking process, and Guess will provide one or more suggestions in the bottom bar. If you click on these selections the replacement will be made.

Project and so on, and resize them if you wish. Graphics are treated as paragraphs on the page, so you don't get clever wrap-around text or any of these super-desktop features.

You can also make global changes to text by selecting on certain text 'attributes'. You can select on a font, a style or a size of text and make a global change to that size or style through the document. This should be in all Mac wordprocessors.

Another feature that is superior to Word 4.0, is WriteNow's better control of page breaks. It has menu selections that let you specify 'Keep on Same Page' or 'Allow to Cross Page', in addition to the usual 'Insert Page Break' command.

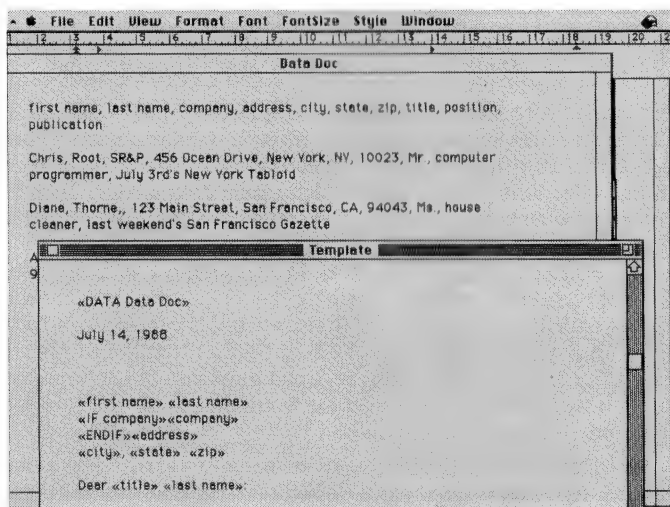
The Merge Document function for multiple letter writing seems to be better than you would expect. It uses a text-file called a 'data document' as a database, with the first line defining the field names, and the second and subsequent lines being the records with fields delimited by commas.

The template document (the letter) uses these field names enclosed by the identifiers (that is, Option-? and Option-Shift-? characters) which tell WriteNow that this is the variable to be replaced. There's one excellent feature here: if you type these variable field names in a special font, style or size, the replacement will mimic your description.

WriteNow also allows conditional execution of the data document list when merging. It has a range of simple commands: If-Else-Endif, Set, Ask, Data, Include, Omit and Next as well as the standard arithmetic operators. These commands are also embedded in the template using the special identifiers to distinguish them.

This macro-language is actually quite a sophisticated feature for mail merging since it allows large documents to be run together, and provides nested conditions to be established. It reinforces WriteNow's primary intention to be a first-class business letter writer, rather than a pseudo desktop publishing program.

The built-in Spelling Checker is extremely fast, with either the 50,000 word or the 100,000 word dictionary, and gives you some strange suggestions at times. Like most checkers, it allows you to



The mail merge in WriteNow allows sophisticated selection using a data document (top window) as the mailing list, and a letter template (bottom window) into which the variables (field names) have been typed.

add words to your user dictionary, but here they've also included a Forget option which lets you tell it to remove a word. This is important because you can easily add incorrectly spelled words into a dictionary, and some don't have a remove option.

Under the same menu, you can count the number of words, characters or paragraphs in a file, and they've added a Change Case selection which lets you convert selected words to upper or lower case. I think this last function is a gimmick, except in programs like Nisus or Qued/M which are aimed at the professional print-editing market. Generally, it is easier and quicker to re-type a word or two in caps than it is to select and use the menu.

What does it lack?

IT DOES LACK a thesaurus, so I fired up my trusty old WordFinder desk accessory, and got some very funny results. It's weird! It always works one word behind. For instance, I asked it to look up 'solar' and got nothing. So I then highlighted and looked up the word 'error', and got the synonyms for 'solar'. The next time I tried 'error', it got it right – it is just always one word behind your selection. OK. I can live with this. But what else doesn't work about this program? Not much!

While the page numbering system is good (you get the numbers at the bottom right of the screen) the number doesn't change until the last vestiges of the page have disappeared from the screen. This means that you can have 99 per cent of the screen occupied with Page 3, yet the numbering tells you that it is Page 2. It should change at the half-way mark.

This complaint feels like nit-picking, but some comparisons with MacWrite II are more serious.

For instance, it doesn't yet have the ability to show samples of the fonts in the Font menu like MacWrite II – and if Claris can do it, Steve Jobs ought to be able to also as this is too good an idea not to include. WriteNow also lacks MacWrite's excellent use of style-sheets and 'Stationary'.

WriteNow should also come with a thesaurus and a macro facility these days but it doesn't have either, nor does it have MacWrite's excellent handling of hyphenation. It also depends far too much on the use of the mouse and menu selections for a fast typist – the programmers are lagging behind a bit here.

But still, this is really an excellent program for anyone involved in business or education who wants a cheap word processor to write letters, handle mass mailings, and prepare reasonably basic reports, memos, and so on. It will take you as far as simple newsletter production with a number of columns and a few simple graphics, but basically it is for writing letters. To my mind it comes second to MacWrite II, but others may disagree.

WordPerfect

IN THE BEGINNING there was WordStar, and all the typists of the world believed in WordStar. WordStar, at the time, was the full Trinity; it ran on the early CP/M business machines, the Apple II (under CP/M), and the IBM PC when it came along later. WordStar became almost a universal word processing religion.

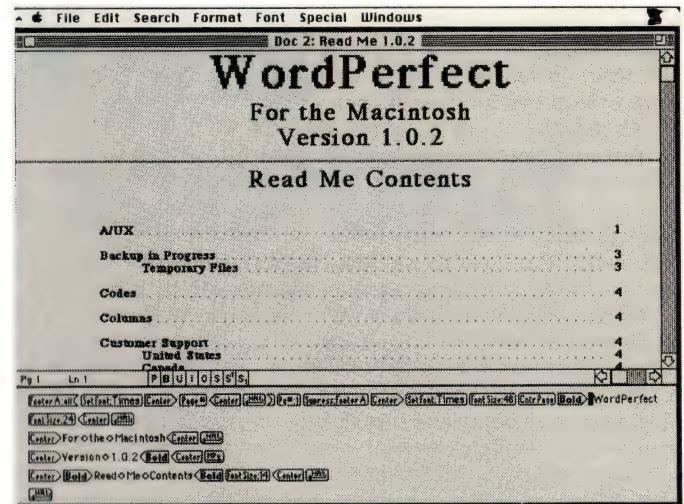
WordPerfect turned up a lot later, but by 1987-88 WordPerfect held 30 per cent of all IBM-PC word processing sales, with Microsoft's Word running second at 20 per cent and the two versions of WordStar collectively only making 15 per cent.

So it is understandable why WordPerfect for the Mac should be an important program and worth reviewing. A large number of its Mac sales must go to organisations that use WordPerfect on their IBMs, and whose typists are already experienced in the program. It makes sense to stay with this program on the Mac if you've

learned it (or are using it now) on IBMs in the office.

This is version 1.0.2 of WordPerfect for the Mac. Don't ask about the earlier versions unless you want to hear horror stories about flickering screens, tabs that didn't stick and a few other weird and wonderful quirks. WordPerfect 1.0.2 is now fixed and usable, and it is a program that will be widely favored, no matter what software reviewers say.

It has a number of oddities, mainly due to hang-overs from the IBM conversion. For instance, you can activate the numeric key-



The code system of formatting is a contentious issue with WordPerfect. The lower half of the window reveals the icon commands which are controlling the style, size and formatting of the document above.

board (if you have one) on the Mac for Page-up, Page-down, Screen-up, Screen-down, Top-of-file, Bottom-of-file functions. You'd probably only select these for cursor control if you'd come from an IBM background where these keys are a reflex habit.

One of WordPerfect's most controversial features is the use of embedded formatting codes which can be revealed by the Show Codes selection in the Edit menu. All Mac word processors have some way of revealing their hidden codes – usually Show/Hide menu selections of some sort which cause dots or diamonds to represent the space characters and some form of arrow or graphic symbol for a carriage return.

But other embedded characters, like centering codes, or codes for bold or italic typefaces, aren't generally shown. You know a center code is there by the fact that the word is centered, and you know that a bold character is there by the fact that the words are bold. To change these 'attributes', you duplicate the actions you took to create them – you select the word, then apply the changed attribute. It's dead simple and an entirely intuitive approach.

WordPerfect takes the hard road. It creates a new window in the bottom half of the screen and duplicates your text with all these hidden commands revealed. Not only that, but you see these commands as special boxed-icons like [Bold] or [Center] or [HRT] (Hard return). There are dozens of these icons and you can find and use them, deleting or inserting them directly into the document through the Search/Replace dialog box.

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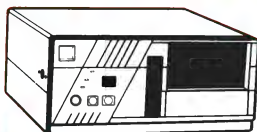
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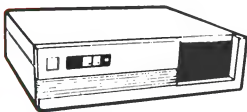


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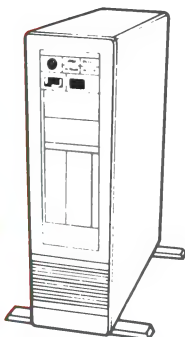


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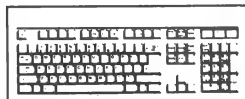
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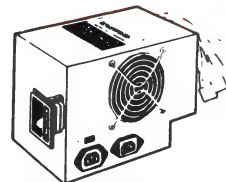
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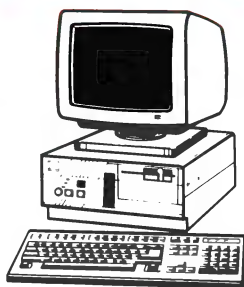
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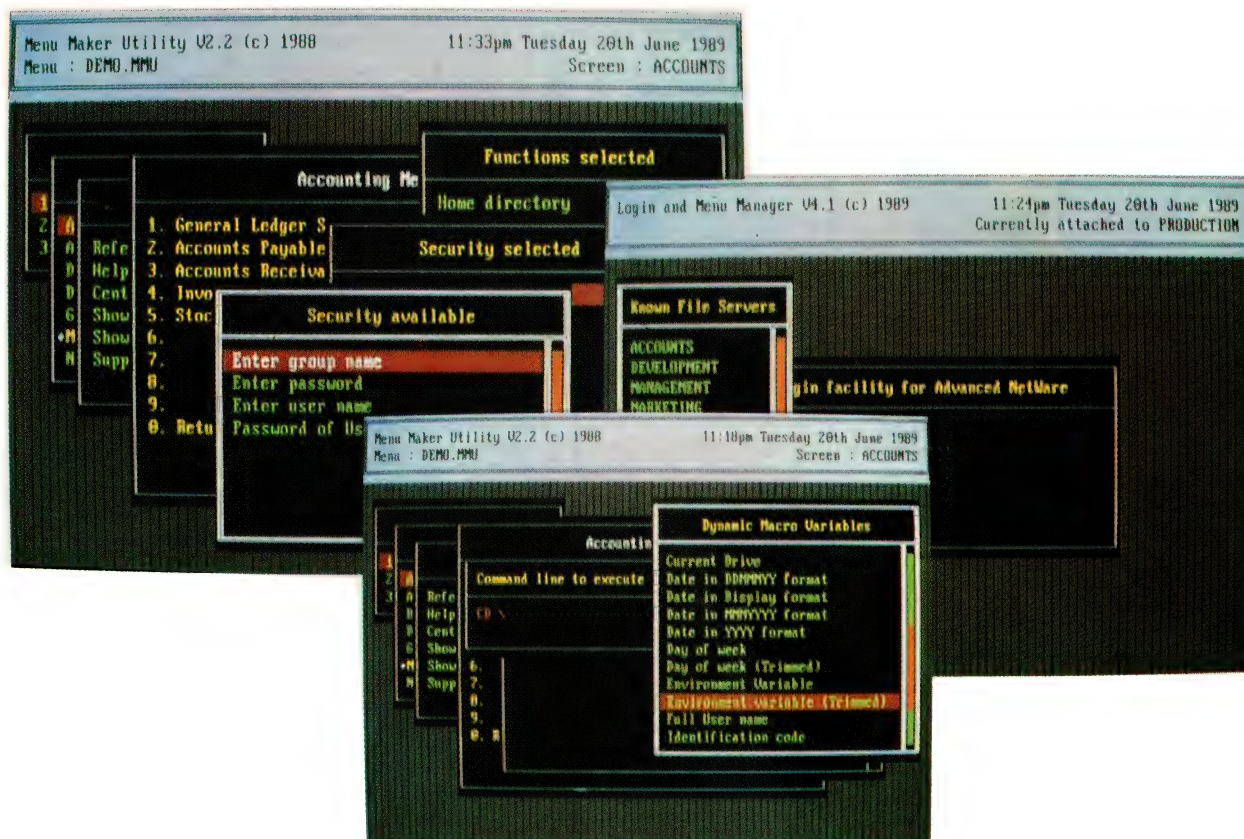
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You can find, select, delete and replace any embedded format or style command as easily as you can a text-word. However, they've gone overboard with this idea; to change a complex-spaced document to single-space, you've got to search and delete the [Space Set-#] symbol/s, and there could be half-a-dozen different ones through the document. It is not an elegant approach – clicking on a ruler icon is a damn sight easier.

You also find some bugs in the coding system. For instance, if you delete one of a chain of Center command icons, you'll find that you are left with lines of text that overlay each other. I've never seen this before in a word processor, but you can do this deliberately in graphic programs. This defect has been turned into a virtue by WordPerfect manual writers, who describe it as a way to 'hide text'. I like their style!

A feature I like

ONE FEATURE I do like is WordPerfect's automatic backup facility. It creates its own transient files usually every five minutes, although you can set this to whatever time-period you like. You can also set a folder location for the backup or, if you wish, make it backup to your normally-saved file. The program's own transient files are automatically destroyed when you deliberately save at the end of a session.

One of WordPerfect's most controversial features is the use of embedded formatting codes.

I had a hard lesson in the value of automatic backup when writing this review. My system bombed completely, without warning, just as I was finishing the article – and I hadn't saved all day. I'm not suggesting that WordPerfect caused the bomb – it could have been any of a number of programs I had running under MultiFinder. But you can imagine the relief when I fired up again and a dialog box told me that I had an unsaved-backup, and asked whether I wanted to use it!

Another excellent feature of WordPerfect is the File Management selection in the File menu. This allows you to manipulate files at the Finder level – delete them, rename them, copy them, and so on, from within the program. This is ideal for small-RAM Macintoshes, but it has now been overtaken by MultiFinder in the larger machines. Everything you can do in File Management, you can do better and easier by clicking on the MultiFinder icon. WordPerfect is advertised as being suitable for 512K Macs where you wouldn't use MultiFinder.

I am a bit ambivalent about the Spell Checker and Thesaurus. They are both extremely comprehensive, but what they gain in terms of dictionary and thesaurus size, they lose through rather clumsy design and slowness in use. WordPerfect goes a bit overboard in trying to cram hundreds of words into the Thesaurus screen for instance, and forgets that the 9 point type makes it hard for older people to read.

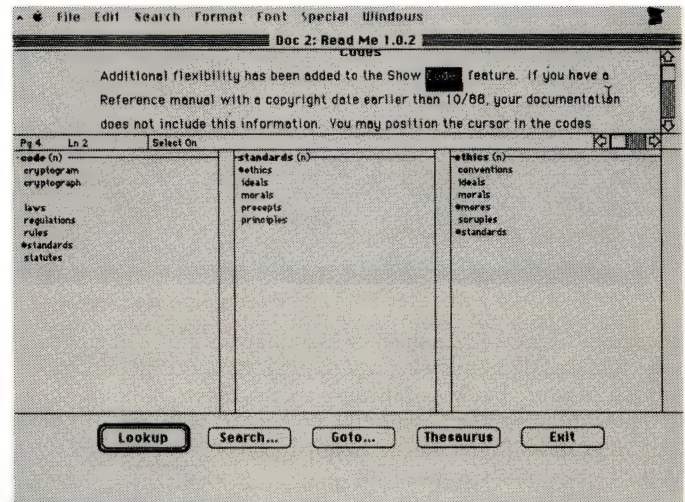
The spelling checker does, however, find repeated repeated words words (sic), which is a major checking feature missing in most of the other Mac word processors I have reviewed. However, WordPerfect treats words-with-numbers like '4th' as some special

case and forces you to click in a special dialog box to accept them. Why?

What a Thesaurus!

THE THESAURUS has some idiosyncrasies also. I looked up the word copyright on one trial run and received the cryptic dialog-box message that it was 'Not a Headword'! The Thesaurus also wouldn't find boy or boy's (it is one of my standard tests to see how spellers and thesauruses handle apostrophes) and I discovered that these weren't Headwords either! Nothing told me what a Headword was.

It turns out that some words in the thesaurus can be searched and others can't. You can search for synonyms of Child (which is a



WordPerfect's Thesaurus is excellent in concept, but it doesn't live up to expectations in use. Words identified by the large dots are Headwords and can be expanded in the next column. You can find synonyms for 'ethics' (see third column) but not for 'ideals'.

Headword) but not Toddler which is part of the child list, but not itself searchable. This is crazy – you expect synonyms to be two-way links. Boy and Girl didn't exist at all, as far as I could see. However, WordPerfect's Thesaurus does provide antonyms, which is a major plus.

One feature that I do like very much for the creating of reports, is the ability to mark doubtful text-strings using a Strikeout font option. You can leave the text intact and in place for the time, then remove it after all approvals have been finalised and additions made. This is for multiple authoring.

There is also a Redline font option which serves to mark new text being added to a document. Again, you select this as if it were a font-style, and then type in normally. After all approvals have been gained, you click on the Remove menu selection, and both the Strikeout text and the Redline markers in the margins disappear, but any new text added under Redline remains intact. This is an idea that all good word processors should have – there's a lot of multiple-authoring nowadays.

Not so good

NOW FOR THE features that aren't so good. First of all, WordPer-

Macintosh wordprocessors

YOU CAN ALWAYS object to the simplicity of generalisations, but they also serve to place the more important factors in perspective. For what it is worth, here are my perceptions of the six Mac wordprocessors I have reviewed in the last couple of months.

WriteNow 2.0 is the bottom end of the Mac market as far as features are concerned. It is extremely good, but it lacks some of the refinements of MacWrite II. This is the recommended economy model.

MacWrite II is (reviewed in January) a complete rewrite of the old version, but also a great improvement. This program is deceptively simple in appearance, and in fact, it has many sophisticated features. I like this program very much. Highly recommended.

WordPerfect 1.0.2 is a good program but it annoys me mainly because it doesn't use the Mac standards and interface features to the best advantage. And, it is difficult to learn. However, it is good at what it does – which is more than MacWrite II but less than Word 4.0. As a straight wordprocessor, I would put it on a level with Nisus – but Nisus does more in the editing and macro features. You'd certainly buy this program if you were experienced with WordPerfect on an IBM PC, or if you

used it on PCs within your organisation.

FullWrite Professional 1.1 (reviewed in December) was a valiant attempt to create the ultimate in Mac wordprocessors with many desktop publishing features, but they failed badly. The programmers need to learn how to write concise and quick algorithms as it is currently painfully slow and requires far too much RAM. Not recommended.

Microsoft Word 4.0 (also in December) is certainly the best of the high-end pure wordprocessors. It has many sophisticated desktop publishing features, but it is so well designed that it is quite suitable for novice users also. There are some irritating inconsistencies in the interface, and the spell checker is not good, but generally, it is everything you could hope for in a good wordprocessing program. Highly recommended.

Nisus (January) is not only a professional word-smith's tool, but also a very good middle-of-the-range wordprocessor. It is more difficult for Nisus to hide its complexities than Word, though, so I wouldn't recommend it for novice users. To get the most out of this program, you need to be willing to learn some simple programming. Highly recommended for anyone in the publishing business.

fect doesn't have a Style-sheet or Stationary facility, and it should have. It makes do by allowing you to program some quite comprehensive macros, but you can only record these by doing them straight-through perfectly with the recorder on. If you make a mistake, you can't edit the macro, so anything complex had better be right or you'll waste a lot of time.

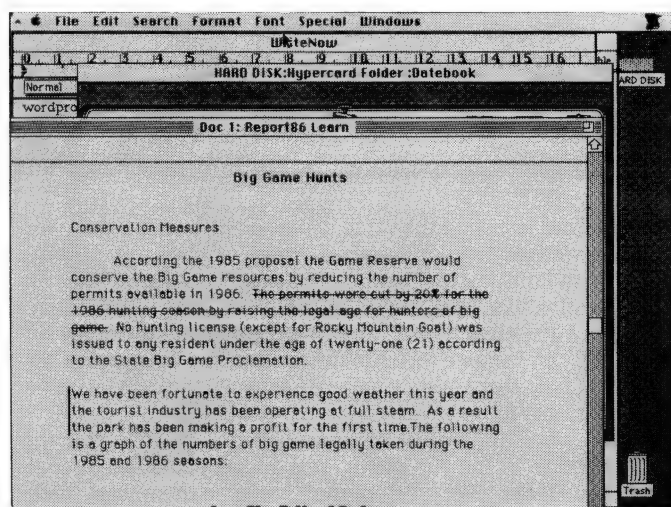
You activate macros through three infuriating levels of menu and sub-menus. First, you select the Special menu, and then you pull-down to Macros – then you slide across to this sub-menu and down to Execute Macro, then a dialog box comes up which gives you the selection of macros as if each were a single file. And, in fact, that's precisely what is happening – if you drop out to Finder and have a look, you'll find your WordPerfect folder chock-a-block with macro icons.

But my real objection to this process is to the way WordPerfect constantly forces you to use chains of menus and sub-menus. I thought sub-menus were cute when I first saw them a couple of years ago, but they've since proliferated like rabbits, and in WordPerfect they've reached plague proportions.

Almost every menu selection in this program has a sub-menu choice, and then if you are unlucky, this sub-menu choice will lead to a dialog box or something else. It takes a lot of manual dexterity to handle the mouse in this way, and I hate taking my hands off the keyboard, even for one mouse movement when I'm typing.

I can't put my finger on any really badly designed functions in WordPerfect, but generally it is not the program for me – and this comes more from a vague feeling that nothing is quite right rather than from any specific problems. If there's both an easy way to do something and a hard way, WordPerfect takes the second path in my opinion. It obviously hasn't been programmed by people who are totally immersed in the Mac interface, and you can see lingering evidence of their IBM background. For this reason, ex-IBMers will probably like this program, while Mac users won't.

I also suspect that WordPerfect is probably the most difficult of all the Mac word processing programs to learn, but that's not going to bother most people who will probably buy it – they've al-



Strikeout and Redline are identifiers of text changes used during multiple authoring. Both are selected as if they were typesets from the style sub-menu of the font menu. Strikeout text and the Redline marker of the new paragraph will disappear with the Remove command.

ready invested their time on IBM systems.

It is not a word processing program I would recommend highly to anyone for general use, but it certainly adequately fills a gap between MacWrite II and Microsoft Word 4.0, and what it does, it does quite well. The only feature that really justifies special recommendation, is the multiple-author Redline and Strike-through fonts. I would certainly consider standardising on this program if multiple authorship was a common occurrence in my company. □

BROADSIDE AGAINST SOFTWARE PIRATES

AUSTRALIA'S INFORMATION industry urgently needs to implement measures to address the increasing problems of unauthorised copying and grey marketing of proprietary software, according to visiting US attorneys and board members of the Business Software Association (BSA).

David Curtis, BSA Chairman and Senior Corporate Attorney for Microsoft Corporation visited Australia late last year with fellow BSA board members, Neal Goldman, International Counsel, Lotus Development Corporation, and Richard Neff, Deputy General Counsel, International Legal Affairs, and Ashton-Tate Corporation, to discuss co-operative strategies against unauthorised copying.

Curtis said the primary purpose of the BSA's visit to Australia was to discuss enforcement and other initiatives against software theft, both overseas and in Australia, and to call on the information industry to take greater action against unauthorised use to protect its intellectual property assets.

'Meeting this challenge requires unanimous support from all industry members – not just software manufacturers, but hardware vendors, OEMs and dealers market the products. The problems of unauthorised copying and grey marketing affect all of us,' said Neff.

Curtis called on public authorities in Australia to play a greater role in the enforcement process. 'Greater vigilance in enforcing compliance, particularly in the public sector, would go a long way to addressing the problem,' he said.

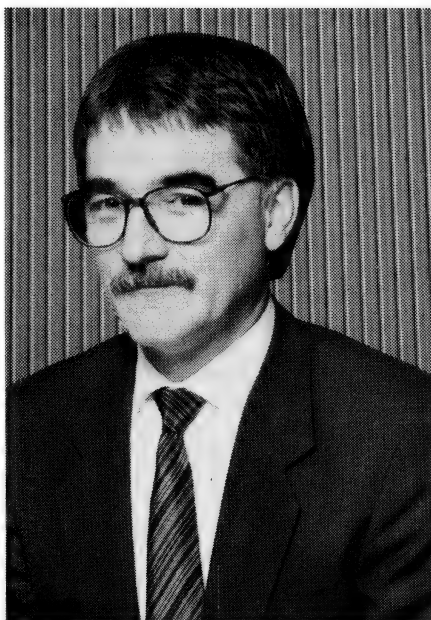
Formed in October 1988, the BSA represents leading manufacturers and distributors of business software for personal computers. Its members are Aldus, Ashton-Tate, Autodesk, Lotus Development, Microsoft and WordPerfect.

BSA has initiated a series of civil and criminal actions against organisations involved in unauthorised software copying in Italy, Taiwan, Singapore and Hong Kong. 'In comparison with UK and the US, Australia currently fares poor in counteracting the problem of software theft. In Australia, only 0.82 software products are

Piracy costs the Australian software industry almost \$300 million annually – but it's the honest users who are paying.

shipped per PC compared to 1.5 in the US and 0.89 in the UK,' said Goldman.

According to him, the problem was assuming serious proportions locally, as shown by studies which indicate that half the software used in Australia is obtained illegally: 'If this trend continues it will rep-



'Unauthorised software reproduction is on the increase worldwide and urgent action needs to be taken internationally to protect the rights of software developers and ensure our industry can continue its reinvestment in developing new products.' – **David Curtis, Business Software Association Chairman and Senior Corporate Attorney for Microsoft Corporation.**

resent a revenue loss to the industry of over \$300 million in 1990 alone.'

The BSA has conducted extensive information-gathering and investigation in target countries, and instituted legal proceedings against unauthorised software copying in three of these countries. In addition, the BSA has worked with the US government, other national governments and trade groups, to remove deficiencies in intellectual property legislation, administration and enforcement, and it has participated in international efforts to strengthen software protection. Recent BSA actions include a series of lawsuits against unauthorised copying by several of Italy's most powerful corporations.

Software copying by large organisational users in Italy causes aggregate losses to software companies in the hundreds of millions of dollars each year. Armed with unprecedented secret orders from Italian magistrates, obtained on the basis of BSA information-gathering activities, BSA's Italian lawyers, court experts and court officers recently conducted surprise searches at several large Italian corporations. The inspecting teams examined personal computers and found numerous unauthorised software copies within every company.

Prison sentences in Taiwan

FOLLOWING BSA investigations, an apartment in Taiwan where software pirates conducted an international mail order operation dealing in more than 1,500 software products was raided by the authorities. The defendants were convicted and each sentenced to two years in prison.

Prior to the action, BSA held a press conference in Taiwan to outline BSA's enforcement plans and to urge Taiwanese authorities to establish a special enforcement unit for copyright infringement, modeled on Hong Kong's Customs and Excise Department. BSA has also raised a number of important issues with US and Taiwanese officials such as Taiwan's inadequate copyright enforcement, its failure to protect US translation rights.



'In comparison with UK and the US, Australia currently fares poor in countering the problem of software theft. In Australia, only 0.82 software products are shipped per PC compared to 1.5 in the US and 0.89 in the UK.' – Neal Goldman, *International Counsel for Lotus Development Corp.*

and its erection of obstacles to the registration of trademarks that have been successfully registered elsewhere in the world.

The BSA has also taken legal action against Singapore distribution and exportation of unauthorised software copies. Following several months of BSA investigation, Singapore police – with the assistance of BSA's private investigators – raided several retail outlets selling pirated software. During the raid, they uncovered a Singapore-based mail order operation which was distributing unauthorised copies of many well-known software products around the world. The seized programs displaced legitimate sales of products valued at over \$1 million. The BSA believes that the seized material represents only fraction of the outlets' actual inventories.

Prior to the establishment of the BSA, its members also worked with investigators and Hong Kong authorities to conduct raids on retail software pirates in the Golden Shopping Arcade of Kowloon. BSA has recently provided additional information and input to the Hong Kong Law Reform Commission on new copyright proposals relating to software. The BSA has also liaised with the European Commission on a software protection directive. The directive, if adopted, will shape software copyright protection in the

Community's 12 member states. The BSA testified at the European Commission software hearing in October 1988 and continues to be involved as the directive receives further consideration by European Community institutions.

International perspective

THE PROLIFERATION of unauthorised copying and 'grey marketing' of original products takes many forms and is not confined to the computer software industry alone. For example, several major original equipment manufacturers (OEMs) with global representation in the heavy machinery sector are concerned about the growing market for counterfeit and pirated spare parts. Likewise, at least one major European women's apparel and travel goods manufacturer attests publicly that it has a century-old problem with counterfeiters. Further, the music industry worldwide has taken a high profile stand against unauthorised copying and plagiarism.

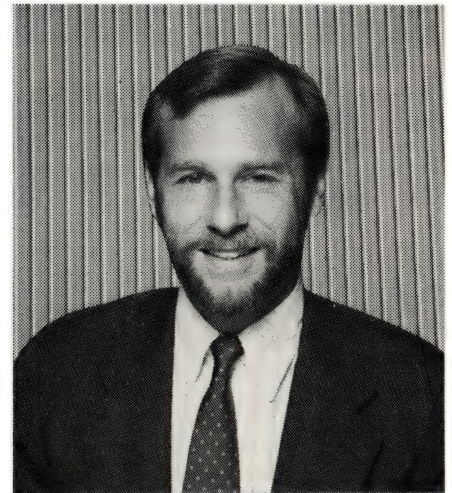
The problem does not stop here. Unauthorised copying is rife in many industries and endemic in many countries. Whether the unauthorised activity comprises procuring OEM labels or likenesses thereof for fixing to copies, or manufacturing likenesses or outright copies of patented designs, whether it be for financial gain ('piracy') or merely for personal benefit or the benefit of a friend ('soft-lifting'), these acts amount to wholesale theft.

According to a survey published in the *Wall Street Journal* in the US, 15 software packages are sold for every 10 personal computers. In Italy, by contrast, the ratio is 3.5 software products to 10 PCs. According to the BSA, if Italians bought as many software packages per computer as Americans do legally, software sales in Italy would rise by \$500 million annually.

Further, on a percentage basis, software sold in Italy, France, England and the US for every personal computer sold in 1988 is as follows: Italy 28 per cent; France 45 per cent, England 72 per cent; United States 88 per cent.

It is apparent that large-scale unauthorised copying is rife in Italy. A recent study of hardware and software sales in Italy by units per genuine software manufacturer also reveals a number of glaring discrepancies, thereby adding considerable weight to allegations of rampant software piracy in that country.

It is no coincidence that software research and development in Italy is negligible. Its lack of growth is inversely propor-



'The major challenge for the industry is to advance the issue of intellectual property protection for software amongst government and legislative bodies throughout the world, many of which don't fully recognise the extent of the problem or the rights of software developers' – Richard Neff, *Counsel, International Legal Affairs for Ashton-Tate.*

tional to the growth of the pirate trade, as confirmed by Italian Association for Software Protection president Silvano Cima, who states that copying has made it 'impossible for the Italian national software industry to get off the ground'.

The correlation between the growth of the pirate industry and the stagnation of research and development in Italy, not to mention the effect the Italian experience has on those countries in which the R & D sector is active, has parallels throughout the world, including Australia.

As well as driving user costs higher (including the costs of copied software to buyers, who ultimately discover they cannot access authorised repair and maintenance services), the hidden economic costs – in relation to employment, productivity, export opportunities and support services – are enormous.

Along with government and legislative support of investigative and enforcement procedures and, in some instances, the reduction or elimination of trade barriers which obscure the problem, the BSA contends that strong protection of intellectual property in the high technology sector, specifically for software development, is crucial.

Without this safeguard, software inventors, whom BSA president Douglas Phil-

lips describes as 'part scientist and part artist', will continue to be robbed of the fruits of their labor. In the present environment, newly developed software has considerably less protection from grey marketers than do literary works from plagiarists.



Curtis called on public authorities in Australia to play a greater role in the enforcement process: 'Greater vigilance in enforcing compliance, particularly in the public sector, would go a long way to addressing the problem'.

The need for action

EDUCATION CAMPAIGNS have been mounted in the past in Australia by the Australian Information Industry Association (AIIA) and the Federation Against Software Theft (FAST). Both have achieved widespread interest and nominal support from the industry. However, neither succeeded in demonstrating the seriousness of the copying and grey marketing problems or the industry's determination to stamp out these unauthorised acts.

A concerted effort over the long term is needed – in the form of both actions and words – to emulate the successes achieved by overseas organisations.

Organisations such as BSA, FAST (UK), ADAPSO (US), Software Publishers Association (US), CADAPSO (Canada), ASSOFT (Italy), APP (France), ISHO (Israel), GVV (Germany) and AIN (Belgium), and all dedicated full-time to tracking and ad-

ressing the problem, through ongoing education, enforcement and prevention measures. By contrast, Australia has fallen behind the rest of the world in recent years in addressing this issue.

In fact, the Australian federal police and Customs have both informally indicated that enforcement is not a priority for them, and they need cooperation and assistance from the industry to help overcome difficulties such as obtaining evidence and test litigation on contentious legal issues.

At the federal government level, no member of parliament has nominally supported or taken up this cause, nor have senior public service department heads expressed an opinion on how the problem can be addressed, other than as an internal policy issue. It has been widely acknowledged that some very large government departments are virtually rife with unauthorised copies, and that there is no policy in place to prevent public service departments from buying grey market products.

In the past, grey marketing and illegal copying was tolerated in various forms by most information industry manufacturers and authorised distributors for a variety of reasons, none of which is openly admitted. However, in a tightening marketplace and an environment of reduced margins,

information industry companies are looking to become more serious and effective in their efforts to curb these practices, which directly affect their 'bottom line'.

The key importance of the information industry to the Australian economy is not often considered by governments, especially in relation to the employment, productivity, export opportunities and support services generated by genuine software developers and imports.

Previous campaigns in Australia have raised awareness and cut down on copying to some degree but none has generated long-term success due to a lack of sustained industry-wide support and backing and the absence of a planned investigation and enforcement strategy.

There is now an urgent need to generate results over the long term in protecting the proprietary rights of software manufacturers, as well as achieving immediate and significant revenue gains for the industry. □

Australian perspective

OF ALL THE computer software products currently in use in Australia, at least one-half have been obtained in an unauthorised way, either through illegal parallel importing of proprietary software, importation or local production and sale of pirated versions of proprietary software, or unauthorised copying of existing proprietary software products.

Historical analysis of the ratio between the installed base of personal computers and proprietary software in Australia indicates that there are 2.1 application software packages in use for every hardware unit installed.

Based on projections by market research company IDC Australia, some 500,000 business PCs will be sold in Australia in 1990. Applying the above ratio, this creates a potential market of 1,150,000 software packages next year. At an average cost of \$500 per unit, the potential 1990 market for new proprietary software is thus estimated at \$575 million.

Assuming more than half this market represents illegal software, Australian developers, manufacturers and distributors will forego \$287.5 million of income in 1990. These estimates are supported by a survey of corporate software theft conducted during 1988 by a leading industry magazine, in which 55 per cent of the business PC user community admitted to copying software illegally.

Unauthorised copying highlights the problems of grey marketing and piracy of hardware and peripherals. Authorised distributors and Australian manufacturers of computer hardware have recognised this problem and many, such as IBM Australia, pursue offenders on an individual basis.

With the increasing use of networking and a widening of cross-environment platforms (such as IBM's Office Vision), there is likely to be a commensurate increase in piracy and unauthorised copying affecting the top end of the software spectrum.

If you would like to know more about software piracy and the activities of the BSA, contact Mark Herford at BSA Software Australia, PO Box 736, Crows Nest 2065 NSW; ph: (008) 02 1143, fax: (02) 436 4221.

BENEATH NEUR



PART 1

Neural Network research is leading us to a machine that thinks, learns and finds solutions the same way the human brain does – but, as Craig Kirkwood explains, no-one yet knows how the brain works!

THE PROBLEM WITH computers is they just don't think. There – I've said it. May the wrath of the entire industry fall upon my head. Until recently, most of the hard work in computing has been directed into research and development, manufacture and programming of serial, one-instruction-at-a-time machines that bear little or no resemblance to the way we mortals actually use our brains – enter Neural Networks.

No doubt, you are aware of the tendency for us journalists to sensationalise,

even at the smallest advances in technology. Despite that, let me say that so far, an unsung branch of Artificial Intelligence is truly remarkable.

In researching for this article, I became aware that few authors on the subject have taken the time to actually explain what a Neural Net is, and exactly why anyone would want to build, design, or even own one. In Part 1 we'll cover the background to Neural Networking and in Part 2 we'll explore where exploration of such an abstract discipline is likely to lead us.

AL NETWORKS



Why Neural Nets?

THE NATURAL WORLD is not symmetrical, geometrical, or even mathematical. Computers, on the other hand, are just *that*. Conventional computer programming is the science of converting a given problem into quantitative terms capable of a solution on a machine that only understands 'yes' and 'no', 'on' and 'off', 'one' and 'zero'.

For most applications, conventional computers – be they mainframe, mini or micro – with their ability to store, retrieve, and calculate vast amounts of information, provide a perfect solution. I couldn't think of a better way to process this document than on my humble, aging XT with WordStar. To better that would be to build a better mouse trap, improve on the wheel, or invest millions in a hi-fi with specifications exceeding the capabilities of my ear! But there are some instances

when a mathematical, linear approach is not warranted.

Artificial speech and vision are two tangible examples – Mr Asimov's robots could not function without seeing and hearing. We will deal in detail with specific applications a little later, but for now let's say that there are many contexts where what is needed is a machine that processes non-definitive information, that is, where intuition, foresight, or experience is needed rather than equations, and where the result may be uncertain, unpredictable, or unfathomable (that is, where the information is 'fuzzy' and grey, rather than black and white).

The most prevalent example of such a machine is, of course, the inside of one's head – a network consisting of a near infinite array of interconnected cells capable of reading, understanding, and remembering this document; capable of interpreting

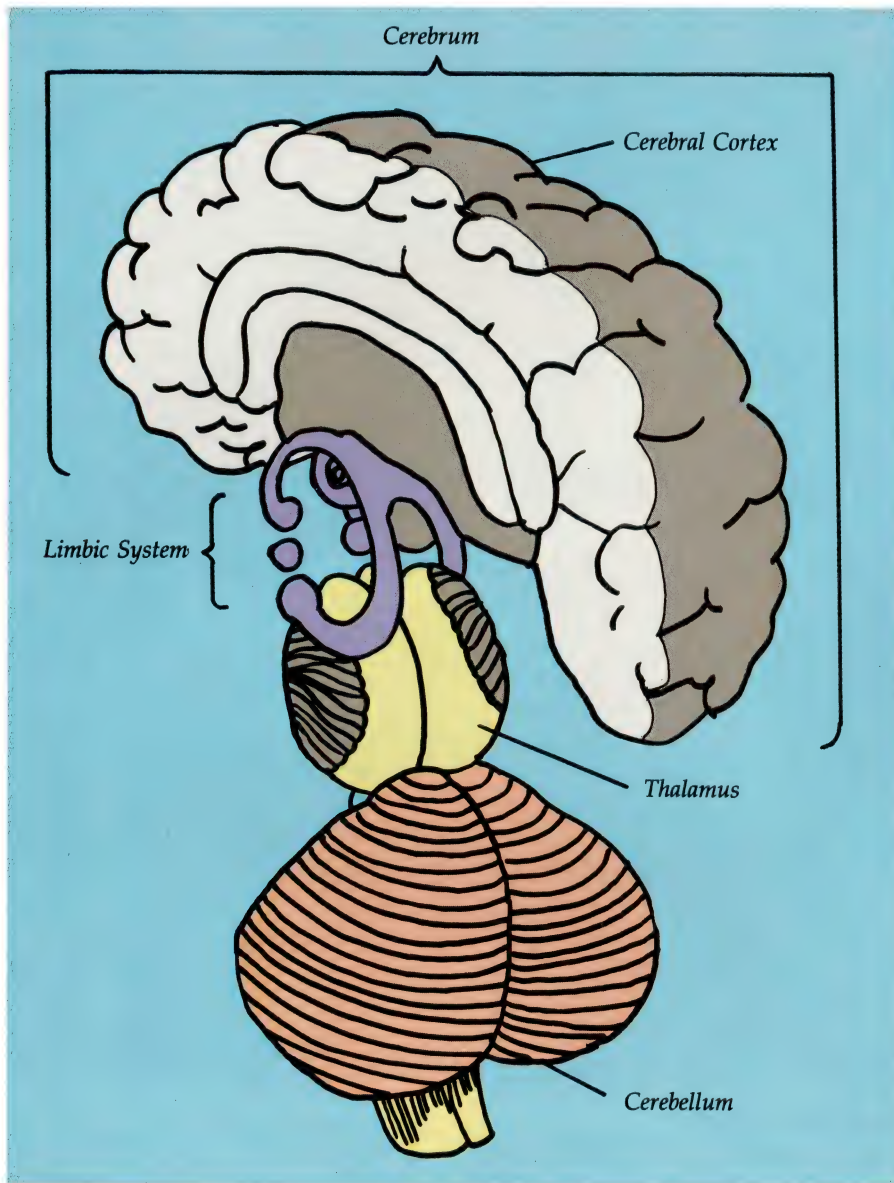


Figure 1. The Cerebrum comprises two hemispheres (only one is shown here). The Cerebral Cortex is a 3mm-thick layer of neurons (see Figure 2) covering the Cerebrum; it is the center of 'higher' mental processes where sensations are registered, voluntary actions are formulated, and decisions and plans are made. The Limbic System concerns itself with actions that satisfy emotions and the basic drives, such as food and procreation. The Cerebellum controls balance and muscular coordination. The Thalamus acts as a switchboard for messages from the senses, while the Hypothalamus (beneath the Thalamus) regulates endocrine activity, metabolism and body temperature.

and criticising the information presented; and further (this is vital) capable of being aware of itself.

Neural Network research is about building a machine that thinks, learns, and finds solutions in the same way humans do because the best example of a Neural

Net is the human brain.

So, the first step is to understand how the brain works. We (the collective body of scientific minds) don't *really* know how the brain works. In fact, one of the initial reasons for designing Neural Nets on a computer was to observe how human

brains find solutions, learn, and processes information.

The idea, then, is to reproduce a model of the brain so that we can feed it information and see how it reaches conclusions, learns and remembers.

Psychology and silicon

THERE ARE, A number of separate schools of science involved in the study of the brain. Psychology, physiology, anatomy, psychiatry, neurology, and biology all seek to comprehend the brain from slightly different, and frequently overlapping, perspectives. Neural Net researchers are particularly interested in psychology.

This century, psychology has taken quantum leaps in understanding how we think. Broadly, there are two major academic factions within the field – biological and cognitive. Cognitive psychology is further divided into those who follow psychoanalytic theory (Freud and friends), behavioral theory, phenomenological theory, and others. Their uniting feature is an approach which is mental rather than biological. Using the analogy of a computer system, the cognitive approach is that of the systems analyst or programmer. The biological approach would be that of the engineer or technician.

The brain is a network in that it is constructed of related, interconnected components. It is also part of a larger network – the Central Nervous System. The Central Nervous System is further part of the Nervous System proper. The Nervous System is constructed of both the Central and Peripheral Systems, and the Central Nervous System is the collective term for the brain and the spinal cord.

The main components of the brain are the Cerebrum, the Limbic System, and the Central Core (see Figure 1). The functions of each section are broadly, but not specifically known. If someone experiences damage to a certain part of the brain we are able to determine that part's function by analysing any resulting disability. We also know that many functions overlap and that there is considerable 'redundancy' between the different sections. More on this later.

Of particular interest here is the Cerebrum. It is this area that is more highly developed in humans than any other animal. The outer layer of the Cerebrum is the Cerebral Cortex, a layer of neurons some 3 millimeters thick and grey in color (hence the expression 'he or she is lacking in grey cells'). The Cortex is important to AI research because it controls all of the sen-

sory functions – vision, hearing (audition) and touch – as well as more complex aspects of behavior such as memory, thought and language.

The Cerebral Cortex is in two parts called hemispheres, and they are in turn divided into four 'lobes' (this is where the term 'lobotomy' comes from – the horrifying, largely outdated, practice of surgically removing a lobe of the Cortex to subdue uncontrollable psychiatric patients). Each lobe appears to have specific functions, again with considerable overlap. Likewise, the two hemispheres have different tasks.

The left hemisphere controls speech, reading, writing, and arithmetic. It operates logically and analytically and perceives in terms of individual features rather than 'holistically' (the whole picture). The right side plays a special role in musical and artistic abilities, in imagery and dreaming, and in perception of complex patterns; it tends to be more impulsive and emotional than the left.

Neurons, dendrons and axons

THE VARIOUS 'PART' discussed above can be thought of as forming the 'systems level', to carry our computer analogy forward. Now let's explore the network at 'chip' level. In the human brain, there are some 12 billion primary cells called neurons – it is the interconnection of these neurons that describes the Neural Network of the Central Nervous System.

There are three type of neurons – Sensory or Afferent Neurons which transmit pulses to the Central Nervous System; Motor or Efferent Neurons which transmit from the brain or spine to the muscles and glands; and finally, Inter or Associative Neurons which receive impulses from Sensory Neurons and transmit to Motor Neurons or to themselves.

As you can see from Figure 2, Neurons are constructed of several parts. The main body has a nucleus in the centre, dendrites (which receive messages from adjacent neurons), and axons (responsible for communication through transmission to the next neuron). At the end of the axon (which may vary in length between several fractions of a millimeter to several feet depending) is a series of tentacles terminating in 'terminal'. Axon tentacles converge, along with many comrades, at a synaptic junction.

It is by way of the synaptic junction or synapse (the region of contact between the axon and the next neuron) that transmission occurs between neurons. The synapse is actually a tiny gap across which

a transmitted charge flows when the electrical potential reaches a certain threshold – not unlike the principle of a spark plug. The neuron takes the sum of the synapses and 'fires' when the cumulative threshold is reached. The firing stimulates other neurons which may then activate a muscle, process a thought, or perform whatever the task may be.

Whether or not the neuron fires is an important principle. It is not an 'all or

none' decision, but is based on 'graded potential'. That is, stimulation, and that may be either excitory or inhibitory (it may cause or stop an action), and is based on a variable voltage. This is one of the characteristics of the brain – it is unpredictable, uncertain and probabilistic.

We have seen that the nervous system, of which the brain is a part, is constructed of many particles (neurons), and that the brain is structured into distinct, and discrete components, all of which have a particular task and are interrelated. It has been shown through that the brain has many areas that process information simultaneously. Through experiment, it is possible to demonstrate that different areas of the brain are capable of performing the same task or storing the same piece of information – a type of built in redundancy.

This explains why, if the brain is damaged in the memory area, for example, not all the 'data' will necessarily be lost. The interconnection of neurons ensures that the same information is stored elsewhere or may be induced from other related information. For example, if I had lost my concept of, say, a mother, I wouldn't lose the entire concept of a family.

If we construct a Neural Net based on the brain, we must take into consideration the brain's flexibility and redundancy. Gary Lynch, of the University of California, believes '... the only way to describe the brain is that while in some sense it is indeed hard-wired, its circuitry is able to change automatically to any given signal. In 30 milliseconds you can take sluggish communication between two cells and sharpen it to the point where they will respond to each other distinctly, every single time a message is sent.' Artificial Neural Nets are based on this principle of interconnection.

Nodes and weights

A TYPICAL NEURAL model consists of a set of nodes, or neurons, and a set of connections. Each of the nodes is allocated a numerical value called its 'activation' – like a name. Each connection is given a number called its 'weight'. The weights represent the strength of the connection between the nodes. I refer again to the fact that neural connections in the brain are based on a threshold such that a neuron will not fire until the sum of synaptic connections goes beyond a certain potential.

Generally, a Neural Network is a dynamic system, moving from one state to the next. As such, there are mathematical

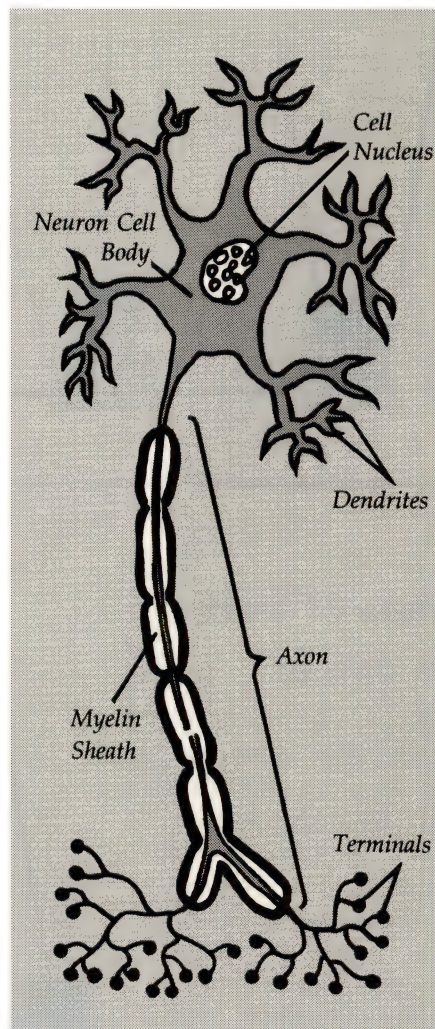
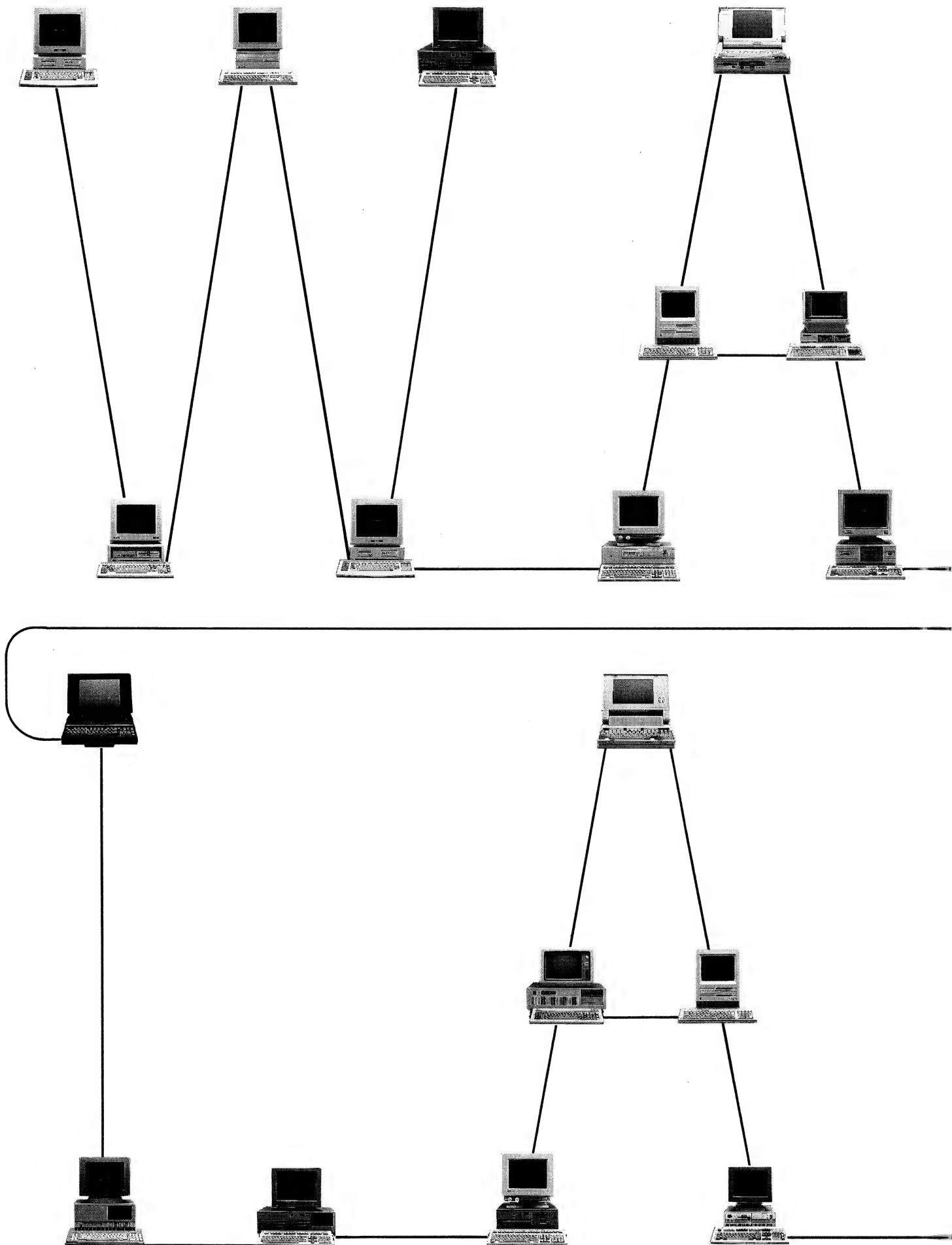
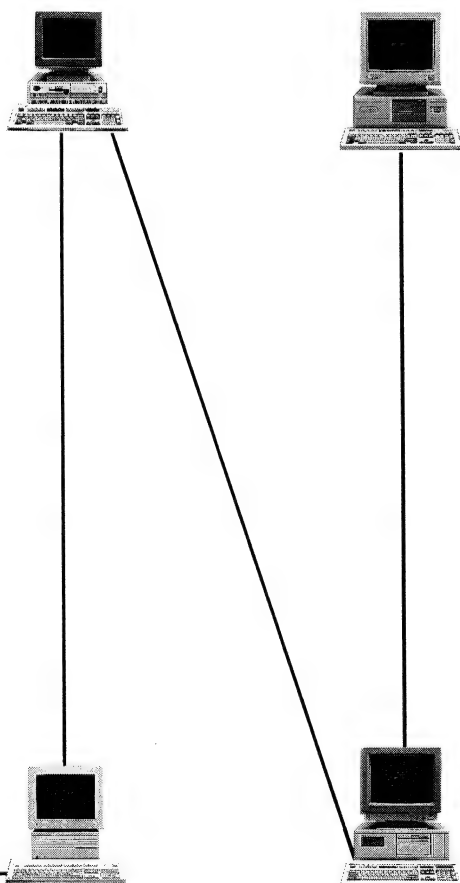
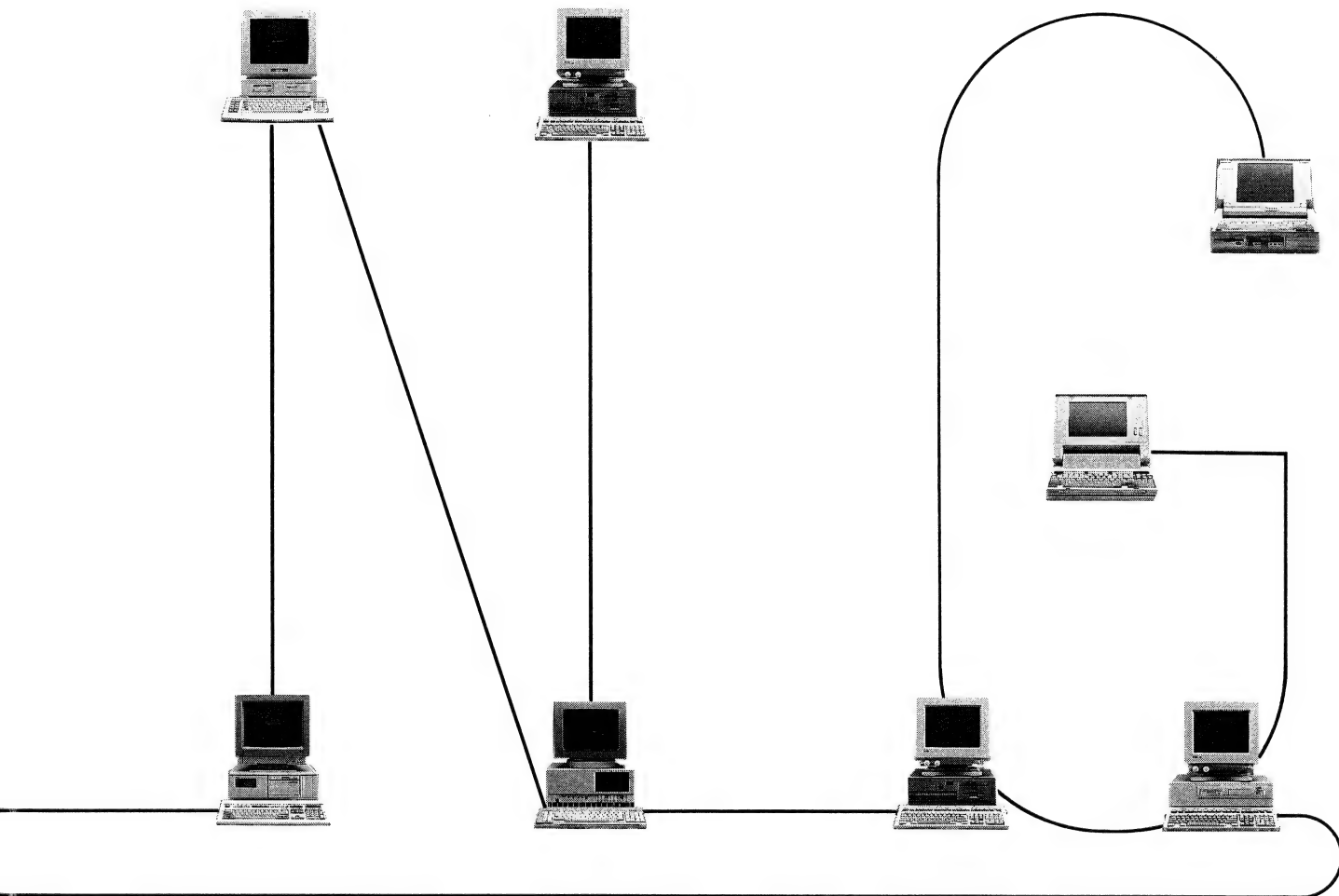


Figure 2. Neurons are specialised cells that form the basic units of the nervous system (there are some 12 billion in a human brain). Dendrites receive neural impulses from adjacent Neurons and pass them to the Cell Body. These impulses – messages – are sent to other Neurons through the Axon. Each Axon has an array of Terminals that pass the message to the Dendrites of other Neurons. The Myelin Sheath helps to increase the speed at which the impulse is transmitted.





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rules which are followed to take it from state to state. An infinite number of rules are possible, although it is beneficial to restrict the model to one in which a given node is only activated by activation of nodes connected directly to it and the weight of the connection to those nodes.

One of the simplest examples of network rules is the 'linear rule'. You can compute the activation of any node as the 'sum of the products of the weight of each node it is connected to and the strength of its connection'. Often such a rule is thresholded, like the biological version.

Another example is that described by Donald Hebb way back in 1949. His rule strengthens the connection between two nodes that are highly activated at the same time, working on the principle that two separate areas of the brain may be involved in the same process simultaneously. This concept is spawned of 'associationist psychology' which holds that associations are built up between things that occur together - 'So tell me, what is the first thing that comes in to your mind when I say ...?' Variations on this rule allow inputs, called teaching inputs, to in-

fluence the change in weight of connections.

So, we've seen that the network of the brain is constructed of nodes called neurons. These neurons interconnect electrochemically and are activated when the sum of inputs from adjacent neurons reach a certain threshold. Software models are based on the same principal of many connections between many nodes,

Using the analogy of a computer system, the cognitive approach is that of the systems analyst or programmer.

each connection having a weight and each node having a value called its activation.

The point we are making here, is that Neural Networks are not explicitly programmed like a conventional computer.

Rather, they obey laws or rules based on the principle of a physical system. A conventional computer runs a program, a neural model simply learns and behaves.

To comprehend the way the brain learns from a cognitive perspective (as opposed to the biological) we must understand the way people learn and solve problems. One of the mechanisms used is heuristics - the internal strategies and common methods by which humans solve problems. This includes 'rules of thumb', educated guesswork, and generally the integration of our many problem solving capabilities.

When I walk to the shops to buy a newspaper, for example, I will be making countless decisions involved in that action. To cross the road, I will make judgments on where and when to cross, based on a host of past experiences. I will not, on the other hand, calculate the speed of oncoming cars, or arrive at a mathematical relationship between the time it will take to get to the other side and the time it will take for the approaching traffic to flatten me.

In Part 2, we will follow that idea through, and then see how it can be applied to computers. □

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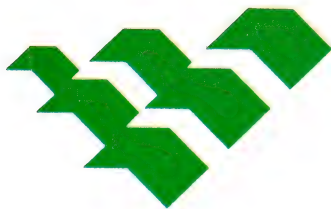
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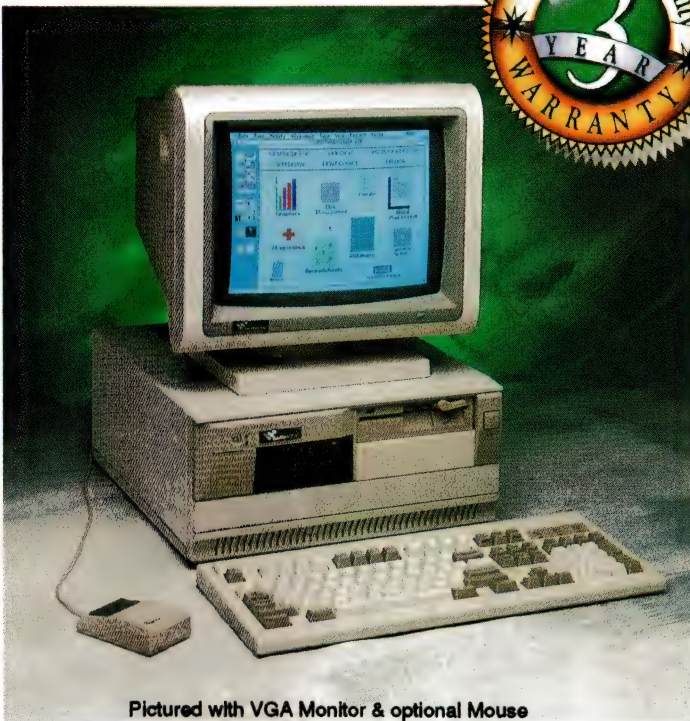
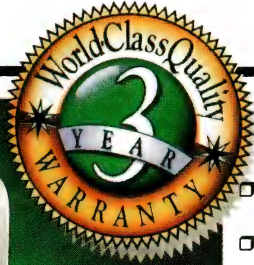
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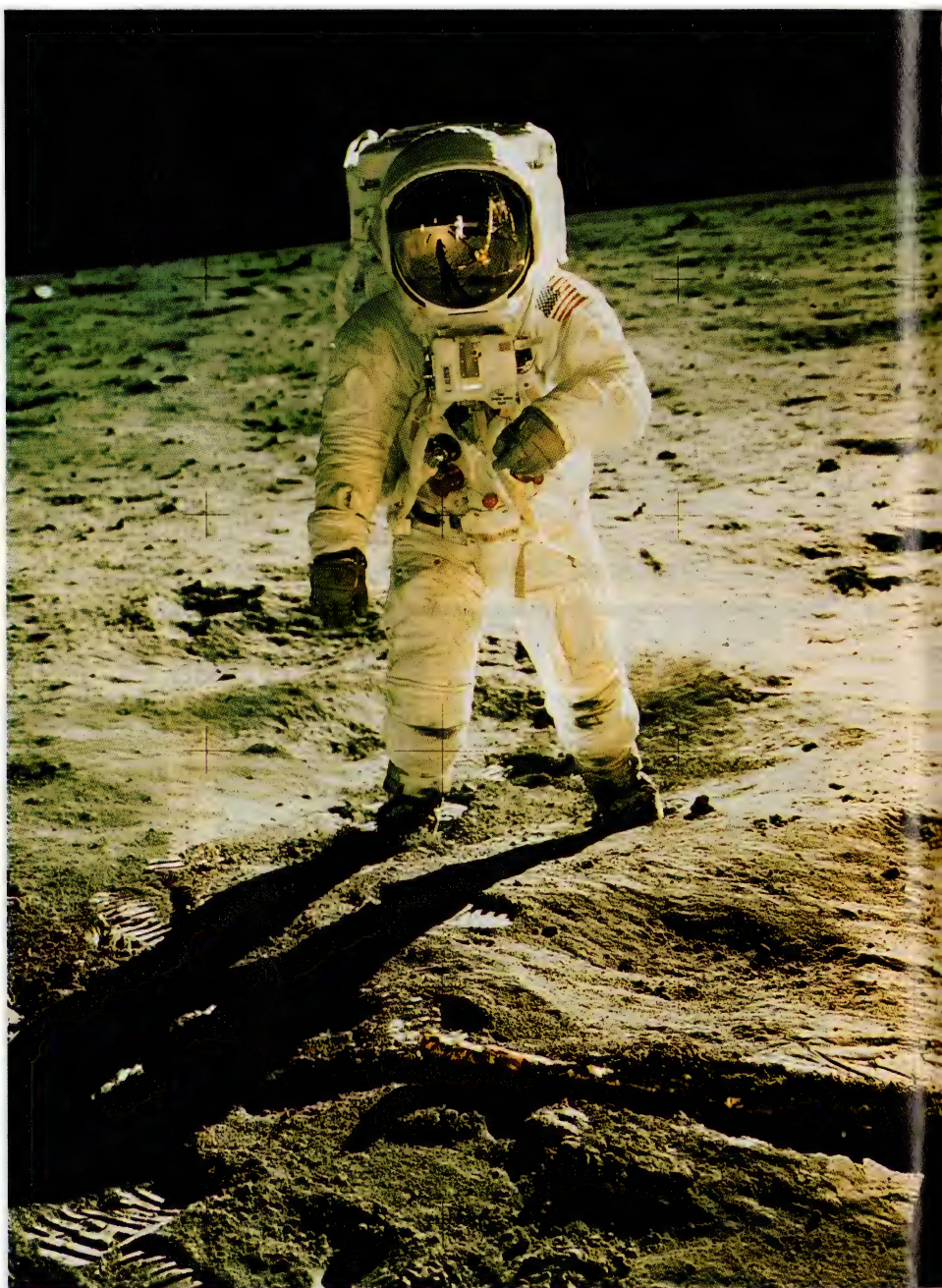
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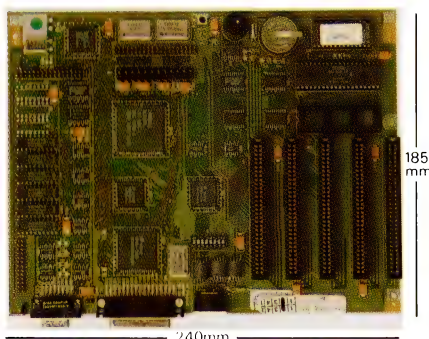


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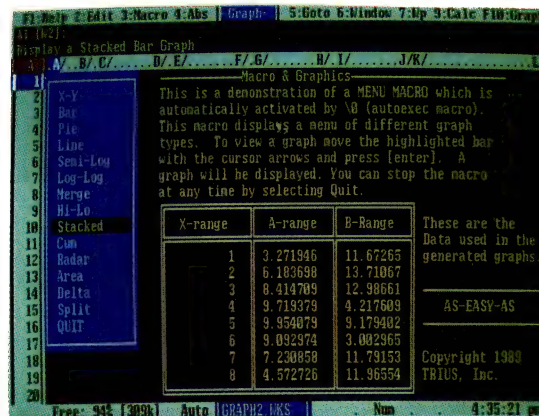


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Would you like to sail away on a yacht or go bush with your computer? Tom Moffat tells how to hook up some useful gadgets to a laptop and charge batteries without mains power.

WOULDn'T IT BE great to sail away to freedom on a yacht, or to take your computing jobs away to the bush, for a long, long time? I'll tell you how, but it's up to you to organise the freedom. I'm part way there I guess. I'm writing this sitting on the beach with about eight hours of go-power in my little Toshiba's battery. But tonight it will feel the familiar tingle of the mains battery charger.

Up the coast a few kilometers from here is a lovely home built of celery-top pine, with open beam cathedral ceilings and big picture windows overlooking the sea. They've got a couple of kids, an old Volkswagen, a vegie garden and a dog that barks violently when I go past in my sea-kayak. What they haven't got is electricity. Apparently the local power authority wanted \$10,000 to run in a power line to them, so they said 'thanks, but no thanks.' Now, they've learned to live without mains electricity. I dedicate this 'Laptop Clinic' to those people, and people like them.

The advent of laptops has meant more and more of them are being used on yachts. You hear lots of talk about laptops around the yacht clubs or down at the docks. One laptop yachtie explained why: many yacht owners are businessmen, and businesses need computers. Computers, including laptops, are tax deductible, and a laptop fits nicely on a boat. What do they use them for? Wordprocessing is popular, or spreadsheet operations – whatever they would be doing in the office. But a shipboard laptop means a businessman can nick off on a Wednesday afternoon, go for a sail, and get the work done as well.

Hobart's Constitution Dock is well known as the place where the Sydney-Hobart Yacht race ends up. But if you go there at other times, there are likely to be a few international cruising yachts tied up,



LAPTOP CLINIC #5



occupied by people who have found their freedom. They always welcome visitors, and if you step aboard and ask 'where's the computer?' you'll usually end up writing off the whole afternoon.

A few years ago shipboard computing was pretty tough. I've met people who carried such things as Apple IIs which they could only use with dockside mains power. Early on in the piece I was involved in a project to get a Microbee and its monitor going on 12 volts DC as a shipboard computer. It worked, but it wasn't very practical. Laptops seem to have solved all the problems in one hit. Computer manufacturers are seeing the light too – in the inaugural Tasmanian Three-Peaks Yacht Race, there was one entrant named, and sponsored by, *Toshiba Laptop*.

This boat had a TI200 (I believe) which

was used for the reception of weather maps by radio facsimile. The skipper could beat official weather forecasts by several hours and gain an edge on the competition. I'm going to have to modestly claim credit for part of *Toshiba Laptop's* weather fax system, because it was based on a decoder device I designed as a magazine project a few years ago. The software was somebody else's, since mine was written for the Microbee.

The weather fax system picked the pictures off-air with the yacht's radio, processed them through my decoder, and fed them into the laptop's serial port. Output was to the LCD screen, but you could only look at one quarter of the picture at a time – to see the whole thing it was necessary to send it to a printer. But even with these limitations the system generated a great

amount of interest within the yachting fraternity.

When I got my own laptop, I soon learned that it had a printer port which could be programmed for input as well as output. So, I modified my own weather fax system to hook up to the input port. This meant re-writing the Hercules picture-producer to work with the LCD screen, which turned out to be a fairly complicated bit of machine-code hacking. But the result was much better than I expected. The pictures were nice and clear, and you could get the entire weather map on the laptop screen in one go – see Figure 1.

That little experiment has now turned into a full-blown commercial product that should be on the market by the time you read this. The system can receive weather maps on the screen, store them on disk for later viewing, print the maps, and also receive, decode, and store radioteletype and Morse Code messages. For the yachting enthusiast with a radio and a laptop computer, it will produce the same results for a couple of hundred dollars that would take \$4000 or so if you had to buy a proper weather fax machine.

Bidirectional printer port

THAT'S ENOUGH EASY stuff – it's time to get technical. A bidirectional printer port has heaps of possible uses besides weather fax. One obvious application is a data logger to input and store data from some scientific study. The data is usually just an analog voltage representing something like a temperature, or a pressure, or perhaps acceleration or deceleration.

The scientist doing the experiment must find a way to convert every parameter to be measured into a voltage. The voltage is fed to an analog-to-digital converter, which produces a number of eight bits or more representing the magnitude of the voltage. The numbers can then be stored in a computer.

I've been working on a project based on a large integrated circuit which can select one of eight analog input lines, and then convert its voltage into an eight-bit digital value. The gadget is driven by the Toshiba's printer port which first tells it which channel to look at, and then reads back the channel's value.

This requires setting up the printer port as an output and then sending the 'magic box' the number of the analog line to read. While the A to D conversion is taking place within the magic box, the computer has to quickly turn the printer port into an input to catch the value that comes



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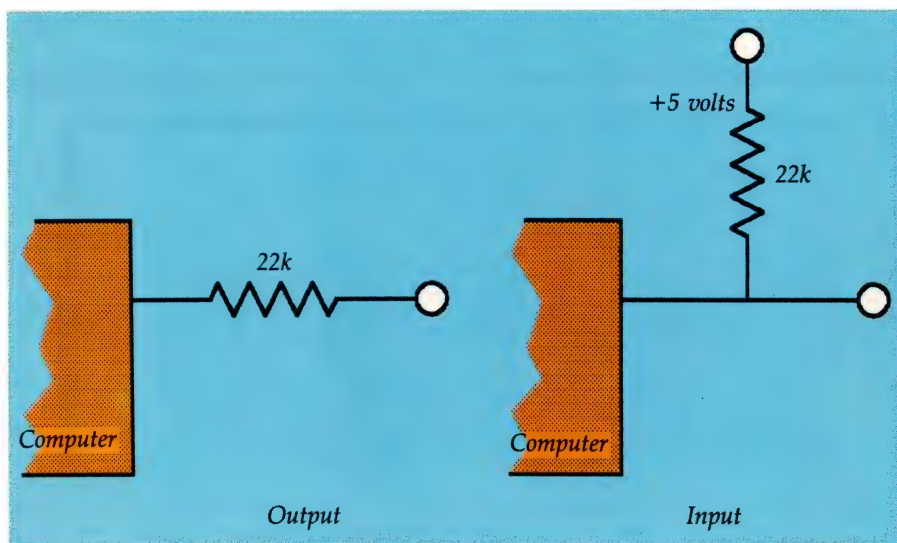


Figure 2. A circuit diagram of the Toshiba's printer port. Both the weather fax and the data logger connections discussed work on this information with no hassles.

bouncing back; all this within a matter of microseconds. A bit of computer programming will make this device take a sample

of any analog line at any time, based on the computer's time-of-day clock, and store it away for future use.

Another application is to make the magic box cycle through the eight channels turn at a regular rate, plotting each value on the screen as an individual trace against time. This produces an eight-channel oscilloscope.

This 'analog data collector' for the Toshiba's printer port seems to have all kinds of interesting research uses, based entirely on what software the computer is running at the time. The eight-channel oscilloscope software would be useful for something like seismic studies. The design is very likely to become another commercial product.

So, how does one make a printer port work both ways? The Toshiba user's manual only mentions that the bidirectional port exists, but it doesn't say how to use it. There is information in the technical manual, but to get one of these you have to swear to God on a stack of bibles that you won't breathe a word of what you see to anybody (a non-disclosure agreement). This would not be so good for a writer like me who would look at the technical manual and then blab to the whole world about it. After all, that's what I am paid to do. So there was a lot of fiddling

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about with DEBUG, and frustration, and finally a couple of phone calls to Toshiba who kindly supplied some photocopies of the software commands needed to turn the port around. I never actually saw the manual you realise, only copies, so I guess I'm free to spill the beans.

A normal parallel port actually consists of three eight-bit ports: a DATA register, where you present the character to be printed; a CONTROL register which sends various control signals to the printer, and a STATUS register which tells the computer what the printer is doing. These all exist in the Toshiba laptop, but there's a fourth register as well, the MODE register.

Two things must be done to turn the printer port around backwards: you must first write a '1' to the MODE register at port address 037F (hex) to enable the bi-directional feature. Writing a '0' to the register turns it back into a boring old printer port.

In the normal CONTROL register, only the five lowest bits are used to control the printer. But in the Toshiba's CONTROL register (at address 037Ah) the highest bit is used as a switch to control the DATA port direction, 1 for input, and 0 for output. So if you first write a '1' to address 037Fh and then set Bit 7 of 037Ah high, you've got yourself an input port. Setting bit 7 low again should instantly turn it back into an output port.

You can use DEBUG to see if this scheme works on your own computer.

You can use DEBUG to see if this scheme works on your own computer. When the Toshiba's printer port is an output, you can write a number to it and then read it back. The DATA register address is 0378h, so with debug you can command something like O (output) 0378 AA. AA (hex) is just a recognisable bit pattern. If you then try I (input) 0378 the computer should respond with 'AA'. To turn the port around with DEBUG, first do 'O 037F 1' to send a '1' to the MODE register. Next do 'I 037A' to read the current value of the CONTROL register. Mine usually produces '0C'. The idea is to send Bit 7 high without changing the other bits, and you can do this with 'O 037A 8C'.



Figure 1. A weather map generated using the weather fax program re-written for the Toshiba's bi-directional printer port.

To see if this worked, make sure nothing is plugged into the printer port. Then do 'I 0378' and the computer should show 'FF'. If you 'out' something to 0378 and then read it again, you should still get 'FF'. The FF indicates that all data bits are high, a condition caused by what appear to be pull-up resistors on each incoming line.

I've never seen a circuit of a Toshiba laptop (gee, I'd like to get my hands on that technical manual) and I've never even seen the section of its innards where the printer port lies. But one can do some tests externally and surmise what is inside.

When the printer port is set up as an output, it looks like there is a 22,000 ohm (22k) resistor inserted in each data line between the plug on the back and the rest of the electronics. These would serve as 'safety valves' to prevent damage if you shorted one of the lines to ground while it was trying to go high. This is a good feature which should save the computer from strife in the hands of a wayward experimenter.

When the printer port is an input, there appear to be 22k resistors connected between each data line and the computer's +5 volt power supply. When nothing else is connected, the resistors 'pull up' the lines to a logic high (which is why you get FF with nothing plugged in).

To get data into the computer you must

work against the 22k resistors. This is a sensible arrangement because it means you need never feed dangerous 'foreign' voltages into the computer. Instead, you can connect each data line to the collector of a small transistor which then acts as a simple switch, not a voltage source. The 22k resistors inside the computer provide the working voltage for the transistors. The external circuit also feeds tiny currents into the transistors, but they act as 'buffers' to isolate external voltages from the computer. This is a bit hard to describe in words, so you might like to refer to Figure 2 which is a circuit diagram of how the Toshiba's printer port looks, at least from the outside. I have based both the weather fax and the data logger connections on this information, and they work with no hassles at all.

Feeling powerless

TIME FOR A CHANGE of subject again. If we are going to operate a laptop on a yacht, or in some shed up the back of Woop-Woop, how are we going to charge the batteries? While there's no mains power, there will probably be a 12-volt battery system, either in the boat or in the car next to the shed. In the case of the boat, common practice nowadays is to keep the 12-volt system charged up with a solar cell array on the deck. The same arrangement could apply to the shed, I sup-

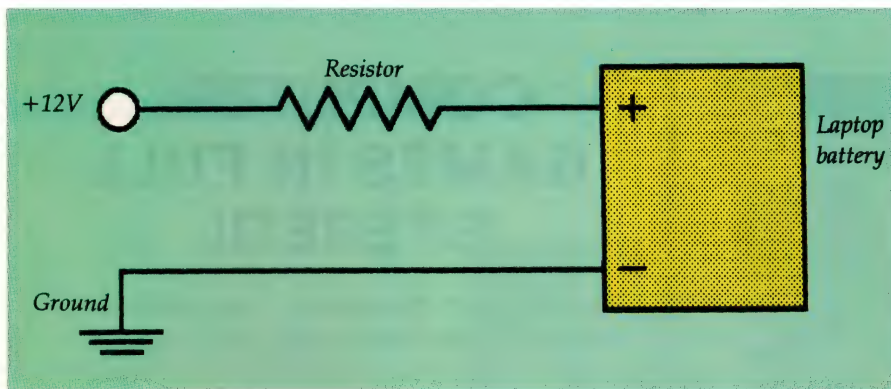


Figure 3. Our do-it-yourself battery charger for use on the yacht consists of a 12 volt supply, a resistor, and some way to connect the computer's battery to the charger. The laptop battery probably connects to the computer via springy contacts of some kind, so you will have to manufacture something to imitate them outside the computer. It needn't be elaborate: contacts made of brass shims, drawing pins, or clothes peg springs come to mind. You can mount them into a wood or plastic tray of some kind and just lay the battery into it. But be absolutely certain there is no possible way the battery can short out. This would destroy it (and maybe you)!

pose, or to that lovely celery-top pine house.

Your laptop probably uses a NiCad battery, and the computer will have some kind of snazzy 'intelligent' charging system to keep the battery healthy. The charger that came with the computer will require 240 volts mains voltage, but most manufacturers also supply a 12 volt charger. NiCads also respond well to the most basic charger possible, as long as you carefully monitor the length of the charging process. NiCad batteries, and intelligent and timed chargers, was discussed in detail last month.

Briefly, a NiCad can be successfully charged by feeding it a current which is one-tenth of the battery's amp-hour capacity. This would be 0.22 amps for a 2.2 amp-hour battery. The charging should continue for 14 or 15 hours, after which the battery should be disconnected and put away, ready for use. The charger connects to the battery, plus to plus, minus to minus. If the charger were simply a big 12 volt battery connected directly to the smaller 7.2 volt computer battery, it would force an immense current into the smaller one, probably destroying it. So the current flowing from the 12 volt electrical system must be limited to that required by the computer battery by a 'series resistor'.

Our do-it-yourself charger, then, will consist of a source of 12 volts from the boat supply or whatever, a resistor, and some way to connect the computer's battery to the charger (see Figure 3). What

about the resistor value? The first thing you learn in electricity is Ohm's Law, which states, among other things, that the resistor required (in ohms) to produce a certain current in a circuit is equal to the voltage (in volts) divided by the current (in amps).

We have just stated that the current required in our charger is the battery's amp-hour capacity divided by 10; that is, 0.22 amps for a Toshiba laptop battery. As for the voltage, we are running off a 12 volt system, and the nominal computer battery voltage is 7.2 volts, so the voltage across the resistor is 12 minus 7.2, or 4.8 volts. So the resistor in ohms will be the voltage, 4.8, divided by the current, 0.22, to give 21.8 ohms. The nearest 'standard value' resistor is 22 ohms, so that would make a good starting point.

It is possible for the voltage across the resistor to vary quite a lot. As the battery charges, its voltage will climb slightly, so the resistor voltage will be less and there will be less charging current. If the boat's motor is running, the 12 volt supply might rise to 16 or so, so the charging current would increase. So to choose the resistor for your system, you should probably assume the battery charger will be used overnight, when the boat's motor is *not* running. You can then calculate a 'starting point' resistor, install it, and measure the current with an ammeter. It should be fairly close to what you calculated; if it's too far out, try a larger or smaller resistor.

Resistors come in various 'wattage' rat-

ings. I worked out that the power dissipated by a typical resistor in a charger like this one would be something in the order of one watt. So to be on the safe side I'd recommend a five watt resistor. It's going to cost you all of fifty cents or so.

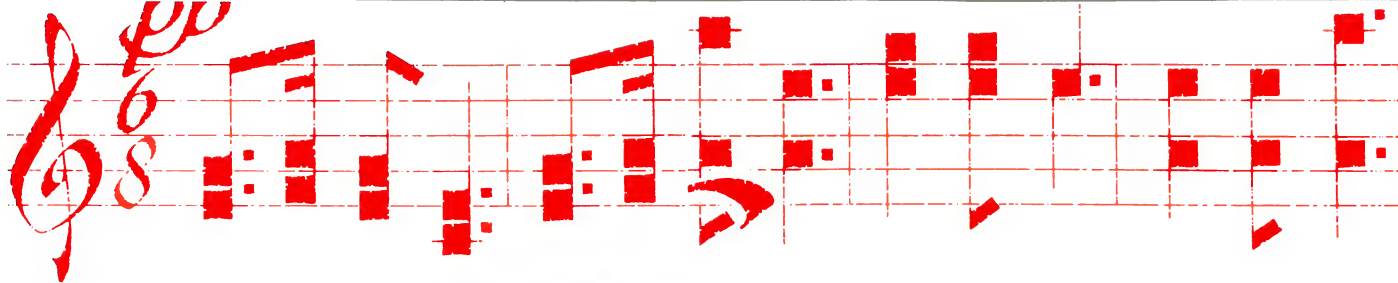
But won't this charger flatten your boat battery? Not very likely. I worked out the power consumption to charge a Toshiba battery at around three watts, is the same as one of the tiny lights on your instrument panel.

Remember that the figures given here are only an example, based on a Toshiba laptop battery. Before you do anything, you must know the amp-hour rating of your own NiCad battery, and its rated voltage, and adjust the resistor value to suit. There's nothing, of course, that says the battery has to be out of a computer. I recently went cruising in the Whitsunday Islands, carrying a video camera to take all the pretty pictures. But I didn't use it much because I didn't want to flatten the batteries. I had no way to charge them on the boat. I just wish I'd thought of the charger idea then!

NiCad batteries, and intelligent and timed chargers, was discussed in detail last month.

And there's no reason why this charger can only be powered from a 12 volt battery system. You could just as well run it off the mains, using one of those little 'plug-packs' to provide the 12 volts. This would give you a way to charge batteries at home without needing to install them into the computer.

But no, that's not the idea at all. It's freedom we want, away from mains power and red lights and traffic jams and irate neighbors. Some of us are going to get it, too. As I write this, a friend of mine has just 'retired' at 47 years of age. He's off to Townsville soon to collect the yacht he's just bought, and then he'll be sailing it right down the East Coast of Australia back to Tasmania. He'll be carrying an Amstrad laptop, and my weather fax system if I get it done in time. After that, where will he go? Who knows, wherever the four winds blow. □



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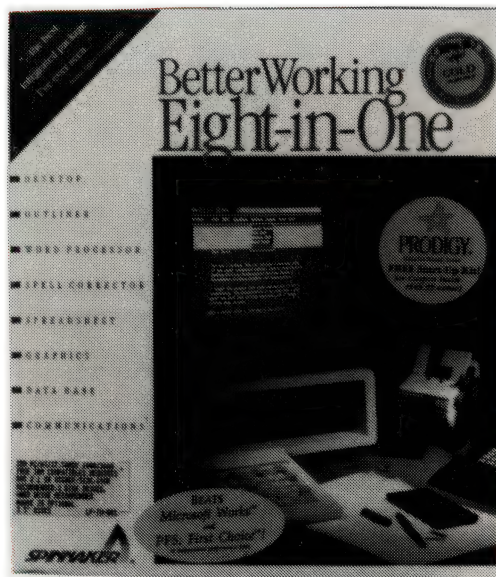
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EDI- THE LEGAL CHALLENGE

Electronic data interchange (EDI) will soon be part of every day life. Anna Sharpe discusses the legal implications . . .

MANY OF AUSTRALIA'S best legal brains will be stretched to the limit during the '90s as governments and business increase their dependence on electronic data interchange and transfer technology. Despite the broad framework of laws governing the general field of high technology, there are still many grey areas surrounding data stored on computer systems and the transmission of such data. Some of these grey areas have already been identified. Others are yet to be found.

Much of the legal 'mind bending' will focus on disputes involving electronic data interchange. In one particular area, that of expert systems, the legal challenges will be considerable. Take, for example, a doctor who uses a pathology laboratory to diagnose patient data. If the diagnosis is wrong, or is subsequently found to have overlooked something, who is to blame? Who can be sued, and how much money is at stake?

The same potential nightmare confronts government departments, companies which use auditing packages, and a host of others who use computer systems to produce solution-type data. In every instance where such data is relied on, there is a real risk that claims of negligence

could arise. Potential claims of this nature are not pie-in-the-sky. Take, for example, an expert system used for AIDS testing, pregnancy tests, or tests for a host of diseases. The legal consequences of incorrect diagnoses could be dramatic. The potential difficulties for someone wishing to initiate a legal action here may include who to sue, and for how much.

The answers to those questions are not easy to find. Establishing the identity of the system developer, for example, can be difficult in itself because the developers of the system's inference component and knowledge base may be different entities. The situation can become exceptionally complex, with different people being responsible for devising the inference engine shell, marketing it, producing the knowledge base, marketing that knowledge base and marketing the combined system.

Even if the appropriate range of defendants is identified, there may well be other obstacles to overcome before someone can be sued successfully. One chief difficulty will be the question of responsibility.

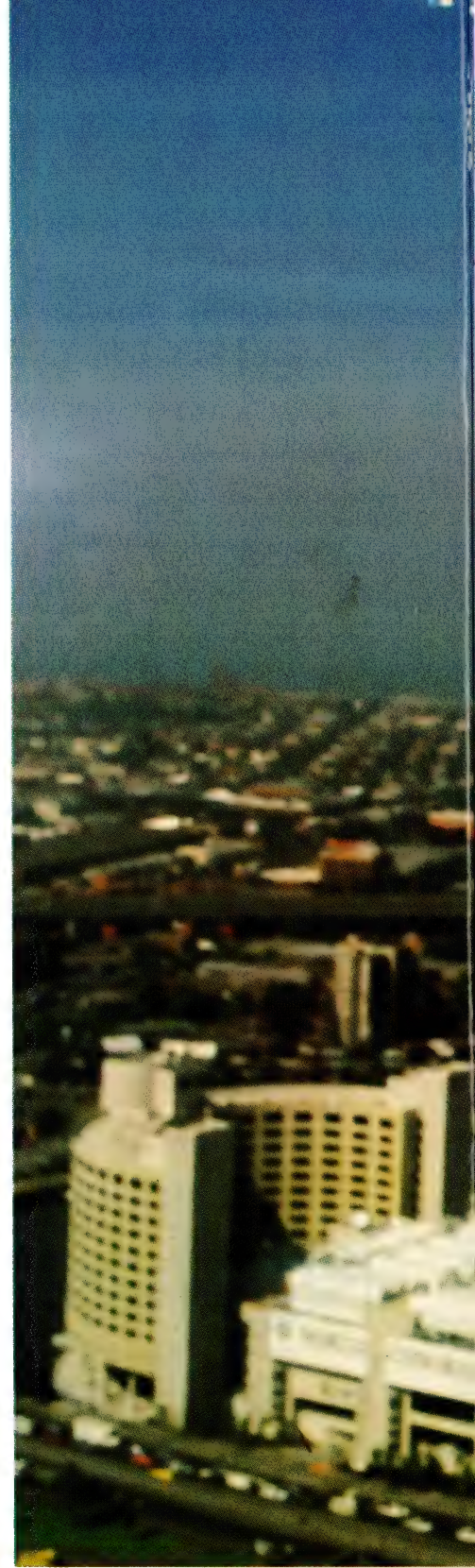
Assuming there are several potential defendants (the dealer who licensed the system, the developer of the knowledge base, the developer of the inference engine and the manufacturer who sold the equipment with its various products as an entire system), which one is liable?

One imagines that in this scenario, everyone at whom the finger can be pointed will duck for cover and pass the buck. If we assume that the person who caused the fault can be identified, the law must determine if that person owed any duty to the user. It must also be determined if it was reasonable for the user to rely on the system. (Perhaps he or she should have had the results, information

or diagnosis double checked by an independent party.) If the user acted 'in good faith', is that sufficient in the eyes of the law?

There is a very large question mark over the whole subject of the extent to which an expert system user has a right to reply

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on solution-offering technology.

As we begin the new decade, there are more questions than there are answers, and the legal profession will have to reverse that situation if electronic data interchange is to become a blessing rather than a curse.

In the next 10 years and beyond, there will be giant strides in eradicating paper-based systems, and that cannot be done without the legal implications being confronted.

In this environment, the corporate lawyer will have two specific roles to play.

First, we must explain to each participant the potential liabilities they face. And, secondly, we must develop contracts which adequately protect all the parties involved in EDI – from the back room program writer to the end user, and everyone in between. □

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OKAY, I ADMIT IT – I like guitars. I know it's old fashioned, but they're just so easy. All you have to do is throw one round your neck, learn three or four simple chords and you can play half the pop music ever written. And best of all, they look great! Writing your own music is equally easy: just take the same few chords, make up a new rhythm or arrangement of them and sing your own melody over the top. Nothing could be easier – just ask Bob Dylan.

Well, nearly – the only other thing that's required to make good music in this way is several years of hard work refining your craft. You need to work on arrangement, harmony, timing and all the other complexities of music, and one of the best ways to do this is to record it, listen to it, and think about it.

It's for this reason that the home studio was invented. With one of these you don't

FOR MUSIC

A home music studio based on an Atari ST is now within reach of both amateurs and professionals – Gavin Hammond of *Sonics* magazine tried one variation on the theme . . .

have to pay a small fortune to record in a big studio in order to hear what your songs sound like or to fine-tune arrange-

ments. For about the cost of one session in a proper studio you can buy a four-track porta-studio and do it in the comfort (and low-cost) of your bedroom. And, if you buy a drum machine, a synthesiser and a microphone, you're in business. You can work out a whole band's parts and create demo tapes of a high enough quality to play to music publishers, booking agents or friends – if you want to make music for more than just your own pleasure. Or, you can use it to experiment with a song before taking it into a bigger studio.

Recording in this way is great, but it does have one slight drawback. If you've recorded a track and you don't like it or you want to change something, you have to re-record it all again: the drums, bass, guitars, keyboards, vocals, the lot. This takes time and the constant re-recording creates an inevitable loss in sound quality. And what if you don't like your rearrangement?

A digital revolution

LUCKILY, WE ARE in the middle of a digital revolution and help is at hand. Now, with Midi (Musical instrument digital interface), you can use several keyboards, drum machines and even guitar synthesizers to create music and record it into a sequencer or computer. This can then be edited, transposed, arranged, mutated and even transcribed into sheet music without even having to press 'play' on a tape recorder.

When everything is as you want it, then you can record it, or even better, synchronise it. This way you can keep it in time with, say, your recorded guitars and vocals, and only have to commit the sounds to tape when you mix down to two-track. And, if you have a sampler you can sample your guitar and backing vocals, include them in your sequenced music, and just record the lead vocals and the sequenced music direct to two-track via a mixer. This effectively does away with the four-track altogether and replaces it with the Midi studio.

Sequencers are basically dedicated computers with music software in ROM and small visual displays. Their compact size and relative robustness make them popular for live work and simple sequencing, but they are limited. However, the power, flexibility and large visual displays of computers 'proper' is increasingly making them the preferred composition tool.



While Roland certainly have a good reputation, the D10 seems overly complex for the tasks it does and the sound is somewhat tinny – the deplorable manual didn't encourage 'user satisfaction' either.

in a big studio with their computer and more expensive gear, and save a lot of time and probably thousands of dollars.

The technological plunge

THESE MACHINES ARE, however, a little more complicated than your average six-string acoustic guitar. To find out just how much more complicated, I took the technological plunge and borrowed an Atari 1040ST, a Roland D10 multi-timbral keyboard, and one of the latest sequencing software packages, Cubase.

In Britain and Europe, Atari is the industry standard for music, both at home and in the recording studio. They grabbed the hole in the computer market between the Commodore 64 and the IBM or Apple PC in the early '80s and, lucky for us, stuck a couple of Midi ports in the side of their machines. This was enough to prompt enterprising musicians and programmers into action. Two companies soon established themselves as industry leaders – Steinberg (who produce Cubase) and C-Lab (who produce Notator and Creator). Both are based in Hamburg, Germany.

In the US (where Apple's pricing policy is a little more realistic than it is here) the

Macintosh is the standard, although Atari is making headway. Here in Australia, the two machines are about level-pegging, but Atari is pulling away fast, more than anything because of price. At a retail price of about \$1500 for an ST with high-resolution monochrome monitor, you pretty well can't go wrong. Compared with at least \$2500 for a Mac Plus, or over \$6000 for Yamaha's new C1 MS-Dos music computer, the numbers speak for themselves (although the C1, reviewed in January, is a portable, which, for some reason always seems to add considerably to the price).

But, as anyone who has used a computer will know, a machine is only as good as its software. Speed, power, size and the brand name all help, but after a while that's only numbers – it's what you can actually *do* with the thing that counts. So what about the Atari and its music software?

For those into numbers, it has a 68000 processor with 32-bit internal and 16-bit external architecture running at 8MHz. In standard configuration, it has 1040K of RAM, 196K of ROM and a single 3.5-inch, 720K drive. The keyboard is very similar to the AT layout and the mono monitor has a resolution of 640 by 400 pixels. It has all

Roland have a good reputation, but this keyboard seemed overly complex and rather thin sounding.

Combined with the latest sequencing software, and multi-timbral keyboards and samplers (which have up to eight separate simultaneous sounds and a drum machine built-in), these machines are making the complex arrangements and high-quality recordings we are used to hearing today, possible with a relatively low budget.

And, if you are serious about recording, you can use the information that makes up the musical performances perfected in your bedroom on your 'affordable' set-up,

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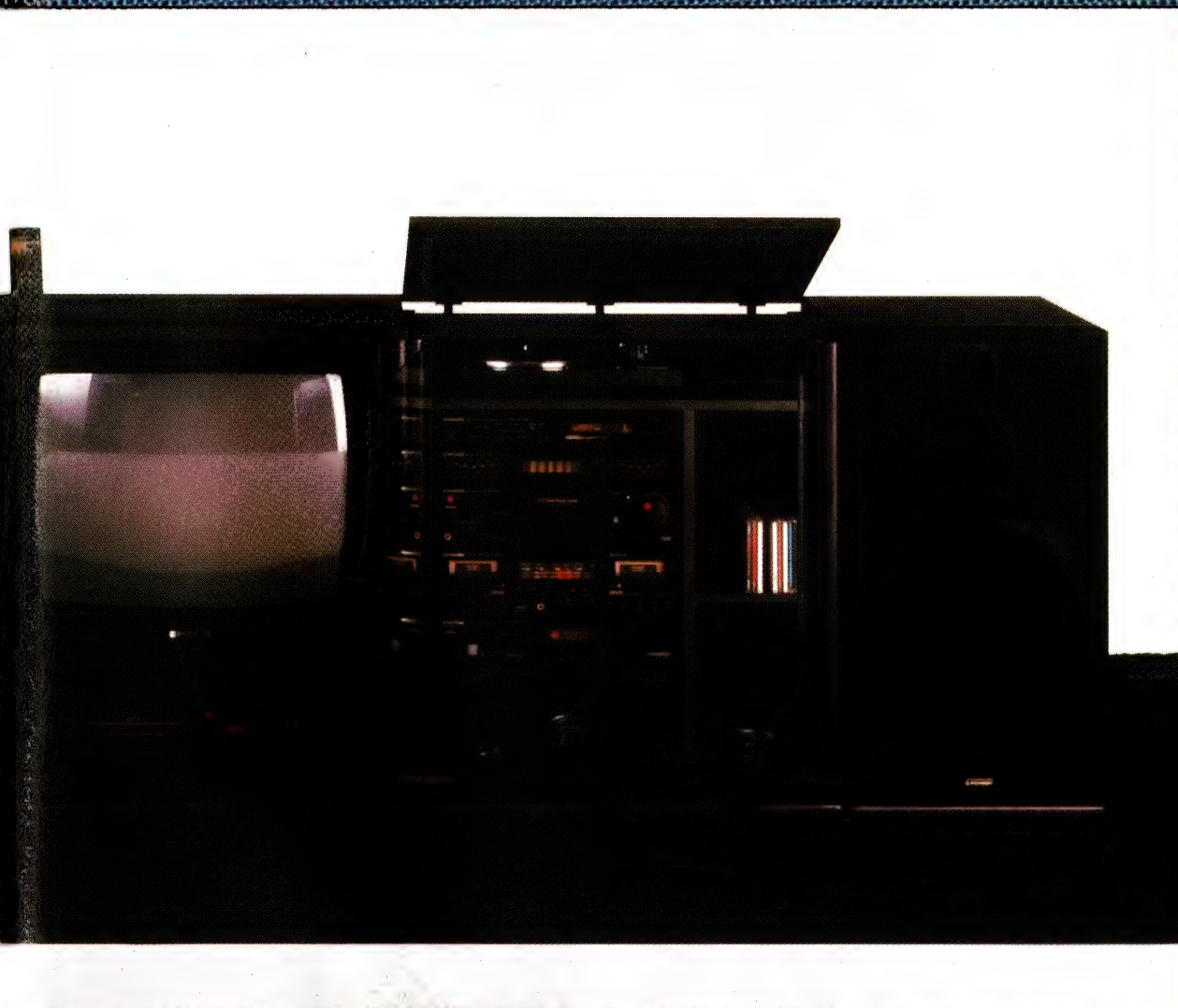
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Ataris for Icehouse

ICEHOUSE WAS ONE of the first pop groups in Australia to use computers for music. Iva Davies, their front man and main songwriter, bought one of the first Fairlights and used it to create his hit album *Primitive Man*. He proved you didn't have to sound like Kraftwerk or the Human League to use computers or synthesisers – you could still be a rock'n'roll band. These days he uses a more economical set-up for songwriting, although the Fairlight still gets an airing live and occasionally in the studio.

He and his guitarist Bob Hobbs and keyboard player Simon Lloyd, all co-write songs for Icehouse now, and they each have an Atari ST, a Roland D110 (the rack-mounted version of the D10) and Pro 24 (Cubase's predecessor) at home. Because Bob lives in Melbourne, Iva lives in Palm Beach (north of Sydney) and Simon lives in inner-city Sydney, writing physically together is logistically tricky.

With these set-ups at home they can work on songs and simply exchange disks by mail to add each other's input. If a song gets to the stage that they decide they want to use it for the band, then they all get together and take it into the band's studio in Erskineville, Sydney, which has a similar set-up. When they begin work on an album, their producer David Lord gets involved. He's based in London and has the same system as the band in his studio. So, Iva just sends him disks of their combined input along with files of his lyrics and demos done in their studio. Lord can then work on the songs with his set-up and use the same information created in the band's various home studios for the final recordings.

I spoke to Simon Lloyd as he was in the middle of working on material for Icehouse's next album about the whys and wherefores of using home computers for making music.

Why did the band go with this set-up?

Well, one of the main reasons was the Steinberg software. I've used lots of sequencers ... but when I came across Pro 24, that seemed to be the best one to use. And, one big reason for that is that Steinberg claim to have sold at least 24,000 copies of Pro 24 around the world, so it's an industry standard. The chances of you going into a studio with an Atari already there are quite good, and the chances are the engineer has already used Pro 24, so you're talking the same language. So, the main reason was the software.

The second reason was the price. You can get an Atari and a top-end sequencer

like Cubase for about \$2000, and for that price you've got a very good system. You can use it at home and in the studio.

Have they had any problems with working this way?

Only with occasional crashes. All programs crash – if you're smart you keep backups religiously and constantly, if you're stupid you don't, and you loose the whole lot after a couple of days. I have the second version of Cubase and it's still got bugs here and there, but generally speaking the manufacturers of software are very good these days.

The trick with sequencers is to make sure you don't erase anything by accident, because using digital equipment now it's much easier to loose an entire song. Whereas on a tape machine you may erase a bit of a guitar track by accident, but erasing an entire song would be very difficult to do.

Any other problems?

Well, none of the machines around are particularly portable for writing on the road, because none of them fit in the cabin of an aeroplane. So a lot of people are eagerly awaiting the arrival of the new

Atari portable, Stacey, which should make life a lot easier. But, you can do it: if you take the D110, a transformer, a computer, a little keyboard like the Casio, and a self-powered speaker, it is possible to do some serious writing on the road. And, in conjunction with a porta-studio you can put guitars and vocals on.

For the top-end professional stuff that's getting into the league of Synclavier and all those kinds of systems which are now costing half a million dollars. So things are moving, now that for 10 or 20 thousand dollars you can get a very good system for a studio.

And what other directions do you see this kind of gear going in the future?

Well, one thing that's happening with these computers these days is that a lot of the outboard gear is moving into the computer – like Midi delay and Midi compression. On the very new software you can actually get real-time equalisation. Digi-Design in America are working on that, so you can actually record entire songs onto hard disks and EQ it digitally rather than using outboard EQ systems. So it's getting very flash.



One drawback with making music on computers, is that, whatever machine you're talking about, the sequencers are now getting very good and you can see what's happening, but you're limited by the screen size and the processor speed in lots of ways. If you want a really professional studio system you need something like an Atari Mega 4 and a big monitor – or the new range of Ataris which are transputer-based. This will give very fast screen redraw, and you could have a massive A3 screen so you can see everything at once – Simon Lloyd, second from right, pictured with Icehouse.

the usual ports: RS232, parallel printer, external hard disk, extra floppy disk, TV, cartridge, mouse and joystick, and, of course, Midi. Although this is not the latest in super-fast, high-resolution technology, it is all anyone needs for making music and most home needs for that matter.

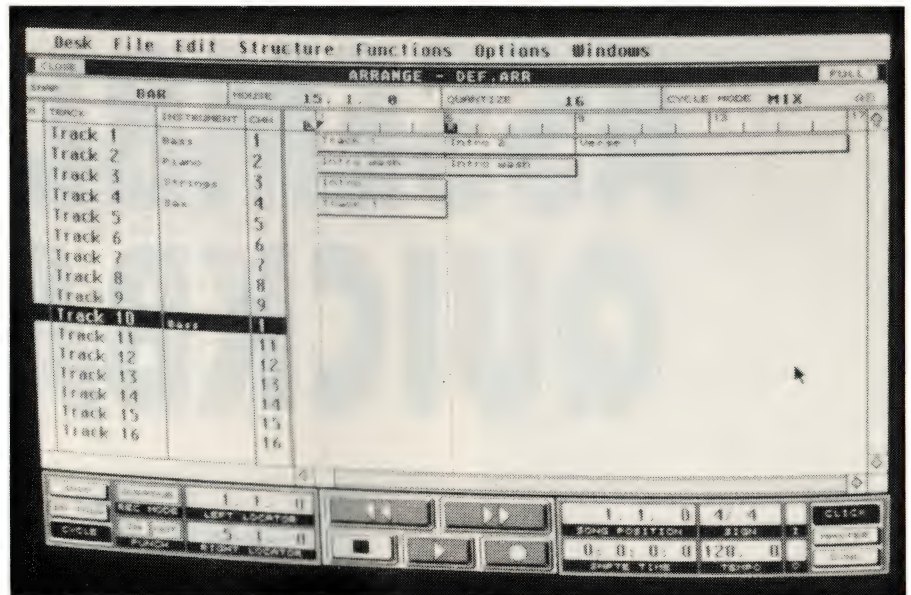
Judging by Atari's pricing and marketing policy, they see this as the Commodore 64 for the '90s. The review machine was supplied with a pack of software games and a simple, but usable, wordprocessor, 1st Word (which I'm using to write this review, after virtually no consultation of the manual).

The machine was very easy to set-up and get running thanks to a clear and helpful manual. The GEM interface and TOS operating system gives a very Mac-like feel and is a breeze to navigate around. Connecting the computer to the synthesiser was a breeze, and after inserting Steinberg's mandatory (and very sensible) key in the cartridge port, I was up and running. Cubase also has a great manual – within an hour of unpacking the Atari, I was seriously contemplating relegating my trusty guitar to retirement.

Cubase (and its competitor, Notator/Creator) is a very visual program. Like most good software (Lotus 123 being the classic example) it appears to be simple, yet it offers incredible power and flexibility. It can have up to 16 arrange windows, each with 64 tracks (or separate sounds) of music, and it has four different editing windows. The whole program loads in one go, and your songs (or separate parts) can be saved to another disk. With M-Ros, the Midi Realtime Operating System supplied, full music multitasking is possible.

The Roland D10

THE PROBLEMS STARTED when I tried to use the Roland D10 and actually record something. Due to an incomprehensible manual, a miniscule visual display, and the fact that I was catching up on two years' worth of development in keyboard technology, I found the D10 a real pain. Roland have a good reputation, but this keyboard seemed overly complex and rather thin sounding. Manufacturers like Ensoniq have shown that multi-timbral keyboards can be made easy; I wish Roland could do the same. I was also hampered by the fact that someone before me had dumped a weird memory card into it and wiped all the internal drum sounds, so I had to use my own drum machine on Midi Thru – I would have thought Roland



Cubase can have up to 16 arrange windows, each with 64 tracks (or separate sounds) of music, and it has four different editing windows. With M-Ros, the Midi Realtime Operating System supplied, full music multitasking is possible.

would have taken the interest to check it out before sending it out!

Nonetheless, after a couple of hours of wrestling with manuals and tinkering with buttons, I got everything talking to each other and got down to making music. I had a slight mishap when I tried to save four hours work to an unformatted disk – Cubase crashed and everything was lost, but we won't dwell on that. I had version 1.0 and hopefully following versions will be more 'friendly'. Cubase's highly successful predecessor, Pro 24, was notoriously full of bugs, but such seems to be the way in the competitive software marketplace.

Within a few days, I had made some tight, well-arranged and professional-sounding music. It was great to be able to cut, copy, move and paste sections of a song just like you can with a wordprocessor, and careful fine tuning of tempo, timing, note velocity, pitch bend, you name it, was all a mouse button away. I have got to the stage now that I simply can't write a story without a computer and I could see that, given time, the same could be the case with music. Using the various visual editing options took a little getting used to, despite their obvious power. It's just nowhere near as easy as asking your drummer to 'just play that bit a little louder and with a little more anticipation at the end of the chorus', or simply chang-

ing the feel in your bass line in the verse a little.

Cubase made life very easy and the Atari presented no problems at all; the monitor was steady and a joy to look at, the keyboard didn't stick, and the machine let the software run its paces – what more could you want? The Roland did its job, but it was no means easy to navigate it. I also found it frustrating not being able to easily edit and alter its preset sounds, but Cubase comes with Satellite, an excellent visual sound editor which kept me quiet. I confess I did use my guitar (with a fuzz box) on one track as no synthesised guitar sound will ever beat the real thing, but I found adequate impersonations to use while working on arrangements.

After some time with this set-up I realised that this is one of the most flexible and cost-effective ways to set-up a home studio and work on songs. I am ready to start saving my pennies and buy an Atari, Cubase (or something like it) and a multi-timbral keyboard. Especially since there are some well respected wordprocessing and desktop publishing programs available to satisfy my journalistic tendencies.

I don't think anything will replace the ease, feel and fun of working and interacting with people in a band, for me. However, as a writing tool or as a time and money saver for preproduction before a recording, this has to be the way to go. □

ASSEMBLING QUICKBASIC

Part 9

DIRECT MANIPULATION of matrixes is perhaps the largest single omission from the 'Microsoft standard' implementations of Basic. Many version of Basic originally written for minicomputers included matrix manipulation statements as standard, including matrix file read and write, inversion, transposition and calculation of the determinant.

As QuickBasic is so much faster than interpreted Basic, it is feasible to overcome this omission with specially coded Basic routines. But, some simple matrix manipulations can be implemented as the machine language functions for extra speed and convenience. The example presented here will clear an integer matrix to all zeroes. It will work on static and dynamic matrixes of single or multiple dimensions, as well as matrixes that use non-zero (or even negative) subscripts.

The routine could be easily expanded to initialise a matrix to a supplied value, or to an incrementing value. Other possible routines include matrix inversion, creating the identity matrix, or adding and copying matrixes. Non-integer matrixes, matrix I/O, and matrix multiplication are significantly more complex, and would be hard to justify as assembler routines without a critical speed requirement.

The secret to manipulating matrixes directly is the matrix descriptor data structure. This serves to describe the matrix in the same way that a string descriptor describes a string. It is a more complex structure than a string descriptor, but for these simple functions, there are only a

Direct manipulation of matrixes is perhaps the largest single omission from the 'Microsoft standard' implementations of Basic. As Jeff Richards discusses, since QuickBasic is so much faster than interpreted Basic, this omission can be overcome with routines.

few items in the matrix descriptor that must be understood.

The relevant locations, as offsets from the start of the descriptor table, are –

00h	Offset Address of the first data element
02h	Segment Address of the first data element
08h	Number of dimensions (N)
0Eh	Number of elements in the Nth dimension

12h Number of elements in the N-1th dimension . . . etc

The routine in Listing 1 demonstrate the use of the matrix descriptor and simply clears a matrix to all zeroes. The routine is declared with the statement `DECLARE SUB MATZER (A%())` and is used in the form `MATZER A%()`. Note that the routine is called with the matrix name – not an array element – as the argument. This means that the address of the matrix descriptor is passed to the routine. All necessary addresses for finding the matrix elements will be extracted from the matrix descriptor.

The 80x86 CPU supports a block fill instruction that makes it easy to fill an area of memory with a single value. The procedure is to load the fill value into AX, the starting address into the ES:DI register pair, a count into register CX, and then execute a `REP STOSW` instruction. This instruction stores the value in register AX into the memory location pointed to by ES:DI, and then increments DI and decrements CX. The procedure is repeated until CX reaches zero. Being able to use an instruction like this is the main reason that this routine will be much faster than the QuickBasic equivalent code.

The number of dimensions has to be extracted from the descriptor table. Then, for each dimension, a running total is multiplied by the size of the dimension. The result is the total number of elements in the

matrix. The area of memory to be filled is the number of elements times the element size – in the case of an integer matrix the element size is one word or two bytes. If the memory is filled using the STOSW instruction, which stores one word at a time, then no further calculation is required.

The result of the calculation can be loaded into register CX. The address of the first matrix element, in segment offset form, can be extracted from the descriptor table and loaded into the ES:DI register pair. Then register AX is cleared, and a REP STOSW takes care of the whole initialisation.

To turn the routine from a matrix zero to a matrix initialise procedure, simply replace the MOV AX,0 instruction with the sequence –

```
MOV BX,[BP+8]
MOV AX,[BX]
```

– and change the RET 2 at the end to RET 4. If the routine was re-labeled MATINIT, then it would be called with the statement MATINIT (N%, A%())

To zero a long-integer matrix, simply multiply AX by two as soon as the calculation

```
TITLE MATRIX      QuickBasic library routine
DOSSEG

;*****
;*   DECLARE SUB MATZER (I%())           *
;*   Clear the matrix I%() to all zeroes. *
;*   NB Call with MATZER Array%()       *
;*****

PUBLIC MatZer
MatZer PROC
    push    bp
    mov     bp,sp
    mov     bx,[bp+6]      ;Get Matrix Descriptor Address.
    mov     cx,[bx+8]      ;Get # of dimensions.
    mov     ch,0
    mov     ax,1           ;Initialize count.
    mov     si,0Eh         ;Initialize pointer to first
    add     si,bx          ; dimension-size field.
Mlop:    mov     dx,[si]    ;Get dimension size
    mul     dl             ; and multiply out.
    add     si,4           ;Increment pointer,
    loop    Mlop           ;Repeat for each dimension
    mov     cx,ax          ;Load count (d1 * d2 * d3 * ...)
    mov     es,[bx+2]      ;Load Segment
    mov     di,[bx]        ; and Offset address.
    mov     ax,0           ;Clear AX
    rep     stosw          ; and clear the whole lot.
    pop     bp
    ret     2
MatZer    ENDP

END
```

Listing 1. The routine Declare Sub Matzer zeroes the matrix. As with many of these routines, the preparation is more complex than the actual execution. The only tricky part of the whole exercise is working out the size of the storage area of a multiple-dimension matrix.

Error

A NUMBER OF errors snuck in during the preparation of January's 'Assembling QuickBasic'. The listings for Part 7 were missing all lines that started with a dot. The standard code to start any of these routines will always follow the same pattern: **TITLE** – Any title or comment can go here.

.MODEL MEDIUM

DOSSEG

.CODE

;*****

; Comments or descriptions.

;*****

PUBLIC (Names of the procedures are listed here) and the procedures will start here.

If any data storage areas are allocated, they will be preceded with 'DATA'

Therefore, the first few lines of both listings in the January issues should be replaced with the format above. Also, the 'DATA' line should appear immediately before the label 'Buffer' in Listing 2.

In addition, the Basic 'not-equal' symbol in the INKEYS example line was inadvertently replaced by a series of typesetting codes – my attempt at an ellipsis in the FEXIST% example line was turned into a stuttering 'th'.

Descriptions for Listing 1 and Listing 2 were transposed. And, the two statements immediately after the label NoFile in Listing 2 should be 'pop si' and 'pop di'. The pop statements at the end of the routine should always be the reverse of the pushes at the start.

We apologise to our readers and the author, Jeff Richards for these errors.

tion loop terminates and before the result is loaded into CX. The statement SHL AX,1 will achieve this. Note that the byte at descriptor table offset 06 contains the size of each matrix element in bytes. This could be used to check that the correct matrix type has been passed to the routine.

Alternatively, parameter type checking could be disabled in the calling program, and the routine could be adjusted to work out for itself, whether it was operating on an integer or a long matrix.

Those who want to zero floating point matrixes are on their own, but note that the structure of the routine means that the total area to be cleared cannot exceed 64K. □

HARD COPY

A Concise Introduction to dBASE

LEARNING ANY NEW language is always difficult at first, and computer languages are certainly no exception. Fluency in the dBase language is mandatory for dBase II, indispensable in dBase III, and extremely useful for dBase IV and it is typical of computer languages. While it claims to use ordinary 'plain English' commands, the syntax is very strictly defined and obscure. User's manuals are notoriously unfriendly to new users, and are easiest to use when you know what command it is you need help with.

A Concise Introduction to dBase by J.W. Penfold (Babani, \$13.00) begins with a brief introduction to databases, explaining various terms such as files, fields and records, and their implementations in dBase. The book covers dBase II, III, III plus, and IV. The first few chapters in the book are relevant no matter what version of the program is being used.

The reader is given an introduction to the various types of fields available, and led through the process of creating a new database using those fields. The commands and functions for searching and manipulating the fields are discussed, with generous use of examples.

An example database (a library catalog) is used progressively throughout the book to illustrate the use of new commands or

programs. The progression through the book is logical – for example, the reader learns how to create a new database before learning how to append records to it, or how to edit existing records.

The last few chapters introduce later versions of the dBase language one by one, discussing additional commands and features that these more recent versions of the program have. The on-line menu system (dBase III plus and dBase IV) is also covered in these later chapters, as is selection of screen colours and label definitions.

The book is not designed to replace the dBase manual, but to act as an introduction to it. After reading the book, the user will know enough about dBase to perform the most common operations on a new or existing database, and be able to know where in the program's manual to look for more advanced information.

A Concise Introduction to WordPerfect

A WORDPROCESSOR must necessarily be easy to use since any tool used for a creative process such as writing needs to be able to aid 'creation' without placing any additional burden on the user's concentration. Early wordprocessors were not exactly easy to use and command combinations were most often obscure, at best. The arrival of faster personal computers, where the software could access the screen more quickly, meant that on-screen menus and help could be incorporated into the program, giving more user-friendly software.

A Concise Introduction to WordPerfect (Babani, \$13.00) begins with the author quoting research results which indicate that most users only use less than 20 per cent of the features offered in a wordprocessor, and the importance of learning the essential features first, then progressing to the more advanced features as they are required. It is written with the complete beginner in mind – one who is encountering wordprocessing for the first time.

WordPerfect versions 4.1, 4.2 and 5.0 are covered in this book, and while the author concentrates on the IBM-PC version of the program, it is still applicable to versions for the Macintosh, Atari, and Amiga.

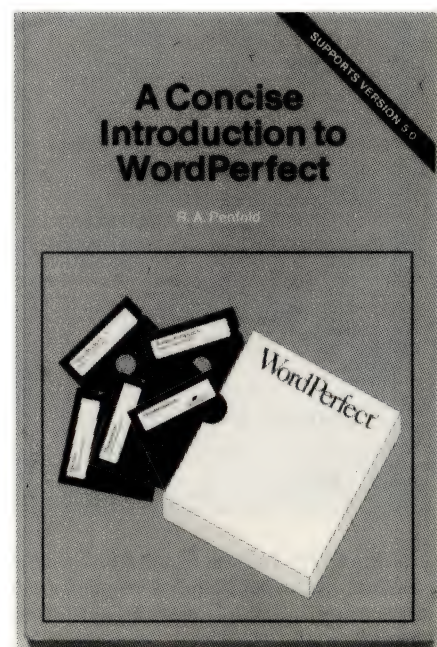
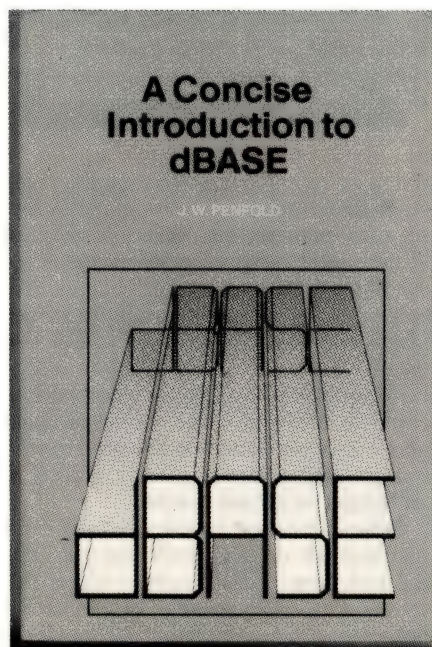
The reader is initially invited to start typing text into a blank screen, and use the cursor keys to move around the screen, in addition to insertion and dele-

tion of text. A brief run-down of file extensions and path names is included in the section discussing saving and loading of files, as is the importance of keeping backup copies of important work.

Coverage is also given to the setting of margins and tab stops, multiple column pages, the use of conditional page breaks to prevent orphans and widows, and the block-protect feature which prevents a block of text from being split across a page break.

The installation and use of printers is covered in the next chapter, including print formatting, hyphenation, justification and the use of different fonts. The final chapter covers the more advanced features of WordPerfect, such as the spelling checker, thesaurus, mail-merge facility, and the in-built sort routine. The graphics import feature of version 5.0 is also covered briefly, noting that this feature is not as powerful as those in a dedicated desktop publishing program.

For the user who has not used a wordprocessor before, or who has decided to change from another one, this book provides a useful introduction. Some of the finer points will need reference to the manual supplied with the program, but the user will know where in the manual to look, which is a boon for novices, in particular. □





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HYPertext OR HYPE?

MODULE 4892 *(This can be a scrollable window of any length)*

Let's suppose that this module, is a section of an encyclopaedia which you have accessed in a search for information on horse-drawn carriages. This module gives you some written information, suitable for general readers, but it doesn't have enough depth for the research you wish to conduct.

In one of the paragraphs, the text here refers to the **Brougham** which was introduced in the mid 19th century. It also tells you that the Brougham was named after **Lord Brougham**, who commissioned the design to provide a comfortable ride. This new design used the new **elliptical springs** invented by a carriage-maker named Elliot in 1804.

You notice that the 'hot-areas' have been identified by some means (here, bold type) and so you know that by clicking on one of these words, the window will expand or change to give you further details.

To module on elliptical springs

Stewart Fist considers whether
Hypertext will only be a
knowledge-junky's sand pit
or an indispensable navigator
through the world of
information.

Module 57211

The Brougham



This carriage was designed for

Module 86287

Lord Brougham 1789 - 1848

This is a brief biography of Lord Brougham, and it could exist at a couple of different levels. The lowest level may be suitable just for High School students, the next for general university level, and a third for historical researchers.

It may contain references to other prominent people of the day and each of these references will refer you to their biographical details, etc.

The chain of references can be infinite, and it can include brief footnotes of the type: *see biographies* which will, perhaps, give you catalogue of books for further reading.

IT IS HARD TO explain a hypertext program to someone who hasn't used one before. It's like trying to tell someone how to ride a bicycle - it's the experience that counts! The basis of hypertext is in the use of dynamic computer functions (instant screen transitions and multiple windows) so examples don't translate easily to paper.

In search of an analogy, hypertext is sometimes called 'extended' or 'generalised' footnotes - a book's footnote is the only paper-based concept that approaches hypertext. But hypertext is much more than this, and hypermedia takes the concepts further into audio and video presentations.

Hypertext programs are usually mouse-based. You simply position your cursor and click on a word, or on part of an illustration. A screen change is then automatically initiated to take you through a link to new text or graphic information.

Ever since Apple released HyperCard, there's been a rise in interest in hypertext concepts. HyperCard wasn't the first practical example of Hypertext on personal computers but it is showy, and it's been very heavily promoted, so people are beginning to take notice. Owl's Guide has been around longer and it is probably an even better example of hypertext concepts, but it was badly promoted in Australia, and thus, hardly anyone knows about it.

Module 85241

This is information about wheel-making and it will give you further information about this process. It may talk about the importance of the new processes of **steel production** for making the rims, and since this is in bold, it will lead you to explanations of the steel process.

carriage



Lord Brougham in 1838

To steel production module

To carriage horses module

In this illustration both the wheels and the horse are 'hot-areas'

Module 56344

This is a Note module that is superimposed on the screen only as long as you hold the mouse button down. It gives you, say, a list of the main published biographies of Lord Brougham.

Note the multiple paths into this module

Hyper-giveaway!

GIVING HYPERCARD away as 'system software' for the Macintosh was a stroke of genius on the part of Bill Atkinson, HyperCard's programmer, who made the giveaway a condition of sale to Apple. The result was a flood of small developers working on HyperCard stacks – there must be a few hundred thousand of them by now. And, recently, we've been beginning to see hypertext programs on IBM PC systems, and there are a number of examples in the micro and mainframe world.

So, what is hypertext (or hypermedia – and I'm going to use the same term to mean both)? Are these programs application, or sys-

tem software, or databases? Are they, perhaps, all three – or none? The question goes deeper than just simple categorisation. It poses fundamental questions about hypertext concepts in general: How do they differ from normal applications? What are they for? What are they designed to do? What are the concepts that underlie hypertext/hypermedia? Why would we want to use these techniques?

Those who have studied hypertext, polarise quite strongly on these questions. Some take the view that hypertext presents new and relatively unique ways of dealing with information. They believe that when hypertext concepts coalesce, we will have the first true 'intelligence extenders' which, eventually, will enable us to think thoughts which are virtually impossible without the assistance of the computer.

On the down side are the cynics who say that hypertext is nothing more than a fad or fashion that represents an evolutionary dead-end in computing. They say that the attraction of non-linear construction of data owes more to anarchistic philosophy than the cognitive science, and that the greater the amount of information a hypertext program attempts to deal with, the more chaotic the system becomes.

I'm one of the world's true fence-sitters in this controversy. I get quite excited by the prospect of being able to zip through vast databases of information on disk or on-line, discover hidden text, make sudden detours into new informational areas – hypertext is a knowledge-junky's sand pit.

But, I also wonder why it is that the major use of Apple's HyperCard is for phone lists, and for Owl's Guide it is only application tutorials. I've got dozens of examples of the best hypertext programs available for the Mac, and I can't say that any of them is noticeably better than a book. Hypertext has made very little impact yet – but it's in its early days.

The world of computing is going to change its emphasis radically in the next couple of years.

There are undeniable advantages in using some hypertext (or related) concepts – and many of these aren't new. Magazines and books use some basic forms of hypertext every day – footnotes and sidebars, for instance. On the pages in this article you will often see one or more side-bars (grey-toned boxes with additional information). These are used to supplement the strict linear nature of reading this article, and this is a basic hypertext idea.

One of the problems in writing for general readership, is that I have to take into account the different levels of knowledge and experience that my readers may have, so I split out certain non-critical items of information and allow you to choose whether or not you want to read them. At the most basic level, this is what hypertext is all about. But there's more.

Some of you are relative novices in computing, some are more advanced, and some are extremely knowledgeable. Imagine for a minute what *Your Computer* might look like if magazine printing costs were cut to 10 per cent and distribution was easy. We could print, say, three versions of the same magazine, catering to the different levels of readership – you could choose your version at the newsagent. This again, is another hypertext concept (which is not yet widely implemented), and with hypertext you should be



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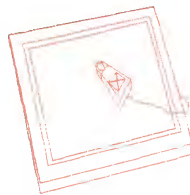


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'The human mind . . . operates by association. With one item in its grasp, it snaps instantly to the next that is suggested by the association of thoughts, in accordance with some intricate web of trails carried by cells of the brain . . . The speed of action, the intricacy of trails, the detail of mental pictures, is awe-inspiring beyond all else in nature. Man cannot hope fully to duplicate this mental process artificially, but he certainly ought to be able to learn from it.' – **Presidential adviser Vannevar Bush (1945)**

able to select the level of complexity of the material you read.

Here is another example of a hypertext function: part way through this article I might mention Vannevar Bush, the founder of the hypertext idea. Some of you may be interested in knowing more about this remarkable man, and others not. If you were; by clicking on his name you could automatically cross over to another article that tells you about Bush and his Memex concept. This is the hypertext concept of expansion – being able to read general information at a general level, while retaining the ability to focus in on those aspects that interest you.

Then, if you wanted to know more about Bush's Memex, you could click on this word and get further expansions detailing the idea. You can follow trails as far as you wish, then usually return through some backtracking mechanism to continue down your original path. This is the hypertext concept of browsing – of following information trails which may not have been used in exactly the same way before, by anyone.

Now we are getting a feel for hypertext, and the possibilities it presents in any form of information presentation – tutorials, factual books, references, manuals – even fiction if you want. Add to this the multi-media possibilities. We click on the name 'John Kennedy' in a history of the USA, and actually see and hear his major public speeches on a video monitor.

We have now extended the basic idea into video and sound, and both techniques require enormous storage capacity, so CD-ROM, CD-I, ISDN telephones, and X.400 messaging all begin to appear as essential peripherals to the hypertext/hypermedia concept. Most of this information already exists on films and tapes, and in libraries around the world – hypertext/hypermedia could well be the way we find it in the future.

Primary functions

SO THE PRIMARY functions of hypertext programs are in organising the storage and retrieval of information – primarily information of the dictionary, encyclopedia, biography type – although there are business-record applications as well.

But we already have information storage and retrieval systems. We have fixed-field databases for business-type records, and on-line 'free-form' fulltext-indexed database systems for 'knowledge-

type' data. We access business systems by record number, company name and so on, and with knowledge-type databases we use key-word searching, indexes and Boolean operators. Do we need anything more?

Hypertext aims to make information accessible without the hassles associated with conventional key-word and text retrieval systems. Furthermore, it aims to remove any structural rigidity from these systems so they can handle text, graphics, sound, and video with equal alacrity.

You can see that HyperCard doesn't provide these last features. HyperCard anchors its links in the Card itself (the fixed-size module), but since the modules are small, this doesn't really matter. A lot of experts would say that HyperCard wasn't a true hypertext program for these reasons, but that's nit-picking at a time when no-one can agree on a definition, anyway.

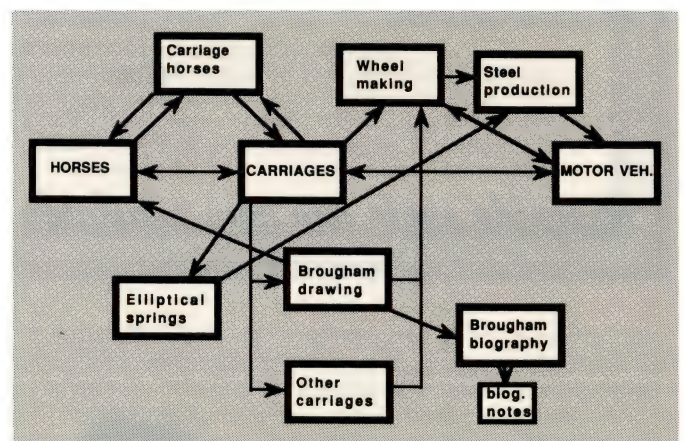
For the time being, recognise that these complex information retrieval mechanisms are going to become more and more necessary with computers in the near future. The world of computing is going to change its emphasis radically in the next couple of years.

We are reaching a plateau in using our desktop computers as text or number crunchers – with wordprocessors, spreadsheets and data lists. Until now, PCs have primarily dealt with information that we have added ourselves. Local Area Networks (LANs) widened this circle (a little) to include data added by other people in our work group.

But in the early '90s, we will see the widespread use of cheap CD-ROM disks – each with more information than any person could type in a lifetime. And, when your telephone line is ISDN, you could have instant computer access to local on-line database services through the D-channel packet-switching system. And, I mean *instant* – it could appear to you to be almost as fast and easy as disk access.

The third major change could be the most important. International messaging will likely become an everyday event through X.400 systems; we will use international computer messaging as freely and easily as we now use local telephone calls.

As a consequence of all these changes (which are happening now), we will have a global information network at our fingertips. So, from now on, we may routinely search billions of modules of information – most of which has not originated in our own organisation. This is a different level of opportunity – and a different



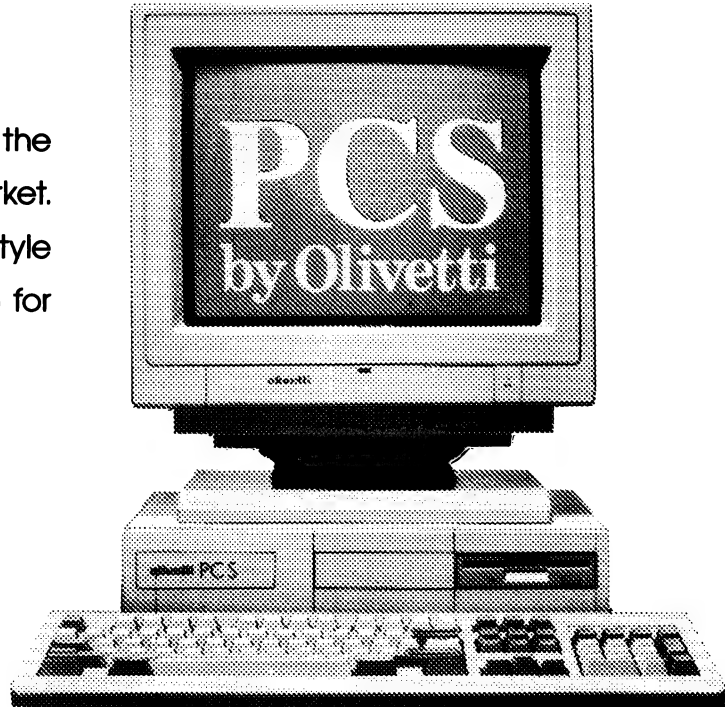
Navigational maps similar to this are often provided in large mainframe hypertext systems to orientate the user to the areas around his current module.

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Information or data?

WE HAVE ALLOWED our use of language to become sloppy. Using 'higher order' terms like 'intelligence' and 'information' when we are talking about computers and communications, gives our work a status that the mechanical nature of the operation doesn't really justify. This is pretty simplistic, but in these articles, I'm going to be using some pretty vague terms in a specific way, so I need to outline my usage.

Data – the word 'fish' is data as far as both the computer and I am concerned.

Information – 'fish swim' is information from my point of view, but just more extensive data for the computer. At the human level, information only involves perception (seeing the fish moving) and a knowledge of the application of language.

Concepts – 'fish swim upstream to spawn' is a concept which involves logical deduction based on the collection and evaluation of a range of evidence. It also involves an understanding of the concepts of time (sequence) and the life-process.

Knowledge – 'fish swim upstream to spawn only in spring because (whatever)' is what I would consider to be knowledge because it involves the linking of concepts or information. This assumption of knowledge may, or may not, accord with the available evidence. When it doesn't, it ceases to be knowledge and becomes belief or theory.

Artificial intelligence or hypertext?

WE'VE GOT TO STOP using the term 'information' in computing nowadays because that term has confusing and ambiguous meanings. Today, computers are merely excellent data crunchers. They can do complex calculations, and that's their main value for spreadsheets and for a lot of scientific work. They can crunch textual data (in the way of text and graphic formatting) through wordprocessors and desktop publishing applications. And, they can search and find categorised data in databases.

But, all computer operations at the present moment store and act upon data.

You can dispute my rigid definition of the difference between 'data', 'information', 'concepts' and 'knowledge', but you can't dispute that there's a gigantic step between a machine's ability to find a word in a mass of text characters, and a human's ability to abstract concepts from a maze of ideas. Until we reach the stage (if ever) where we can provide our computers with all the background knowledge and understanding that we learn from birth, then we can only really speak about computer hardware in data terms – not information.

This doesn't mean that we can't put in and extract information or knowledge from a computer. It is just that this knowledge and information is the result of human intervention – not machine mechanics. We do this when we write an intelligent report, argue an idea, define fields for a database, or make a distinction between sales and profit cells in a spreadsheet.

Artificial intelligence (AI) programs aim to encapsulate and store more elaborately-linked information functions in the form

of knowledge bases. These are stored pockets of human experience that the computer simply matches in some way, and uses to re-define its handling of the data (establishes a link). AI programs aim to produce an 'intelligent' decision – but that decision is primarily a result of the human concepts stored in the knowledge base or in the program's linking structure; they are not due to the machine's manipulation.

You could do exactly the same with an enormous store of file-cards, and a bevy of file clerks who look up the stored information, then make a series of sequential moves based on pre-arranged instructions contained on those cards. We don't need a computer (or intelligence) to do this job – its just that the computer makes it quicker and easier.

Hypertext aims to perform the same high level functions as AI programs, but in a different way. Instead of the computer looking for a match in its knowledge base (actually an 'information' base) using your typed answers to questions, hypertext programs function instead on links established by the author and later selected by the human user.

We are verging on an esoteric philosophical argument here, and I don't want to be caught up in this totally thankless task – beginning with the dictum 'I compute, therefore I am!' But I do want to make the point that hypertext is as different from our standard application programs, as these were from our fixed-program machines like the typewriter and mechanical calculator.

Epistemological assumptions

BY NOW, ANYONE versed in philosophy will be champing at the bit because of my simplistic approach to the question of what constitutes knowledge. To put it another more 'erudite' way: 'such queries about the hermeneutical/interpretive foundations of hypertext... constitute a reminder of the necessity for awareness of how epistemological assumptions about the nature of knowledge underlie the powerfulness of these new concepts' according to V.M. Doland.

I wouldn't put it that way myself, simply because I don't speak the same language, which illustrates the need for different 'levels' of information in public hypertext systems (and possibly also the need for sub-editors)! It also raises one other possibility – perhaps I could click on the phrase and get a common-English translation.

This 'note', on a 'sidebar' to the main text, is already two levels removed from the original linear article structure. Obviously, if this were hypertext, we could go off tangentially in this discussion about epistemology, and never return.

But would we gain from this freedom? *That* is the question!

level of problem.

I predict that ten years from now we will see PCs primarily as information retrieval tools, with only a secondary use for wordprocessors, spreadsheets, and so on. In this world, hypertext systems may be the way we select and extract the relevant modules of information from the billions of modules instantly available worldwide. I don't necessarily agree that hypertext is the way – but there's many more knowledgeable people than me who would class this as a certainty.

But there's a down side to all this also. In an attempt to create some standards for future hypertext programs, the Hypertext '89 conference spent a lot of time on the 'key issue' – the appropriate size of the information modules. Some systems emphasised 'individual concepts' (cards) while others went for larger bodies of text (documents). Behind this argument, however, is the question of linearity. The real question they are asking is 'Do we force readers just to read a little bit of linear material before they can escape, or do we force them to read a lot?'

And, since the main 'philosophy' behind hypertext is to remove the rigidity of linear progression through the material (and this has been elevated almost to the status of dogma) then there is a certain amount of philosophical confusion here.

The fact is that very often authors don't want the user/reader to have the freedom of exploring every possibility; we don't want them necessarily to have a free path through information. If your reader has a completely free path through information, then the author is relegated to the level of a Trivial Pursuit card-writer – just a supplier of random snippets of information. When people are seriously learning a subject, they usually need the direction of an author/tutor to make sure that they cover all the essential concepts in a structured way, so as to build one concept on another. You may differ with me here – but you certainly can't be dogmatic about the value of free-roaming versus directed progression through important learning material.

There isn't any strict definition yet of what constitutes hypertext, but there are some factors that tend to cluster in programs that have hypertext abilities. A number of the current applications have one or two hypertext features, few have many.

Modular storage of information

HYPERTEXT INFORMATION is stored in modules rather than in linear or hierarchical data structures. The analogy is with a series of cards and/or documents carelessly thrown down on a table – rather than with them arranged sequentially in a filing cabinet. I stress, however, that we are talking here about the way the information appears to the user, not how the data looks to the machine. These modules are called 'nodes' in the terminology, and they can be card-sized as in HyperCard, or full document-sized (of any length) as in Owl's Guide.

In a database, the record/modules are sequenced by the machine; in hypertext, the modules are linked by human intervention, either by the author or the user. When I click on a button, HyperCard takes me along an author-set link to another card.

If the two primary features mentioned above are present, then we can say that this program has basic hypertext features. But, there are other features that accompany these nodes and links – some as a direct consequence, and others as add-ons, which give more hypertext-like functions.

For instance, if we have free-floating modules of information connected only by links, then we have an almost-random network structure, rather than a linear or hierarchical one. This is a logical corollary, and hyper-fanatics always talk about 'webs' of data.

However, HyperCard, for instance, has Stacks (files) and cards with a pre-set background. Owl's Guide uses a document-like structure with relational links just like a relational database. Thus, some hypertext programs *do* have a degree of structure, it is just that it doesn't necessarily feel that way to the user.

Bi-directional links

OUR LINKS MUST have a beginning and an end – we talk about these as 'anchor points' and 'destinations' – but they can be single-direction links that only take us in one direction, or they can be bi-directional which toggle us between the two modules.

HyperCard, for instance, only has single-direction links, but it keeps track of your progress in an invisible 'database', and it has additional algorithms to allow you to step back through your sequence. This approach has both advantages and disadvantages over bi-directional links.

HyperCard also has only one single basic link – the Goto statement in HyperTalk. The links are also made from areas on the card

(buttons), and not from the text or graphics which contain the information. A word (or image) in a HyperCard field can appear to be 'live' by superimposing a button over it, but if more text is added, the characters move behind the button. Other hypertext programs anchor the links in the text itself, so that if the text moves, the live-area moves.

The destination of a link should be an idea, not just a module – especially when the module size is large. It doesn't matter so much with HyperCard since these modules are only one card (concept) size, but with Owl's Guide and programs that hold longer documents, the destination of a link must be the relevant part of that document – not just to the document itself.

There isn't any strict definition yet of what constitutes hypertext.

Since there is no imposed sequence of access to hypertext modules, the programs will usually provide both browsing and navigational functions. The distinction is merely in how purposefully you wish to move through the modules.

Browsing is a desirable feature of hypertext, but not a necessary one. Remember that some modules may be the destination of dozens of links from other modules. So, without navigational aids, you can often find yourself back in this same module, again and again, arriving from different locations. This can become infuriating. Purposeful navigation and aids, to avoid becoming lost in the maze, are increasingly necessary when we call upon the program to handle large numbers of modules – and if we aren't handling large amounts of complex information, then we hardly need hypertext.

A lot of stress is now being laid on presenting the user with a 'map' of the modules surrounding the current area (often with a choice of a wider 'area' map included) to help him locate himself in the maze. Some systems identify modules on this map that have already been visited in the current session, to avoid unplanned repetition.

Hidden text or sub-modules

SOME PEOPLE would maintain that this is a central function of hypertext, while others would claim that it is only superficially related. This is the capacity to bury extra information such as text, graphics, and sound, beneath a live area, and have it only appear on request.

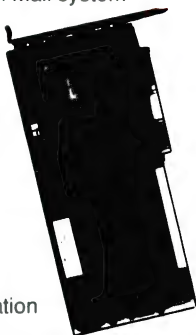
You find this idea in Outliners where a list of chapter headings can be expanded (one at a time, or all together) into lists of sub-headings, and these into sub-sub-headings, and so on, until eventually you get to the 'body copy' level. Outliners have a strict hierarchical structure with each level rigidly linked to the last, but with hypertext you can get all sorts of links and expansion systems.

HyperCard has a very elementary 'show field/hide field' command that needs to be added to the Card script – but much the same can be achieved by links to other cards in the Stack. Owl's Guide, however, has a very rich set of expansion capabilities, and mainframe programs go much further again. We'll look more at these differences in a second article. □

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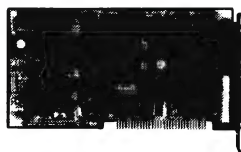
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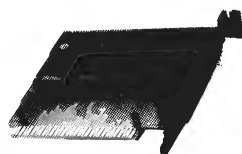
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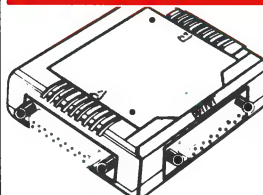
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ROD IRVING ELECTRONICS

A FLIGHT



OF SCRIBES

Late last year, 200 journalists from Australia, New Zealand, Canada, the United States and Europe were invited by Toshiba to visit Japan for the release of two new additions to their already extensive range of laptops. Mark Cheeseman was amongst the Australian contingent . . .



OF COURSE, a company doesn't need to fly such a veritable army of scribes from all corners of the globe just to release a couple of new products – there had to be another explanation. Before the actual product launch, we spent two days touring Toshiba's R&D and manufacturing facilities – and what we saw was only a small part of Toshiba's operation in Japan, but nevertheless, gave us an interesting insight into the world laptop leader.

Toshiba is one of Japan's largest companies with sales totaling more than 3,800 billion yen (about \$A38 billion), and has research interests in fields as diverse as power generation (30 per cent of electricity produced in Australia comes from Toshiba-manufactured alternators), nuclear plant design, domestic appliances, and of course, computers (and not just laptops either) making it the third biggest electrical/electronics manufacturer in the country, employing nearly 75,000 people.

Toshiba assembles its range of laptops at its manufacturing plant at Ome, just outside Tokyo, with an annual production last year of 577,000 machines! The 75,000 square metre Ome building is but one of a total 22 manufacturing plants operated by Toshiba in Japan, and is also the site where its range of Winchester disk drives are assembled. These are not only used in Toshiba laptops, but also in other manufacturers' desktops and laptops – a point that the PR people at Toshiba are quick to point out.

The entire Toshiba manufacturing operation, both within the Ome plant itself, and between it and the other manufacturing sites scattered around Japan. This computer-integrated manufacturing (CIM) system was developed, naturally enough, by Toshiba. The system has been successfully marketed to several other large manufacturers in Japan, including one of that country's largest manufacturers of drink containers. Local area networking ties the computers within the various sites together, and land lines between the company's many sites in Japan ties these networks effectively into one large WAN (wide-area network).

The company not only manufactures computer systems, but also a large proportion of the components which go into the systems. The Ome plant has a flexible production system which is linked, via the network, to the head office. Sales and order information is available to instantly gear the production lines to meet sales demand. In addition, components for the production run are also secured automatically, using the same system.

One of the reasons that Toshiba has been able to establish itself as the leader in the laptop market is that its manufacturing facilities are backed up by an extensive research and development program at its R&D facility. This allows the development of new computer models to take place hand-in-hand with that of the new chips which the machines need in order to fit more functions into a smaller space.

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TOSHIBA



Wafers of 16 megabit DRAM chips undergoing visual inspection at the ULSI Research Centre. Toshiba is already working on techniques for manufacturing the next generation 64 megabit chips.

The Toshiba R&D Centre and ULSI Research Centre is located at Komukai, about mid-way between the cities of Tokyo and Yokohama, and is the place where the company carries out much of its leading-edge research in fields as diverse as superconductivity, high temperature gas turbine design, videotelephones, high-definition TV, automatic language translation, high density memory devices, and high speed gallium-arsenide (GaAs) semiconductor materials, to name but a few.

One development which is likely to bear fruit soon in the computing field is a new 14-inch active matrix liquid crystal display (LCD), which was jointly developed with IBM Japan. Two versions of this display are

in existence – a black-and-white model with a resolution of 1440 x 1100 pixels, and a colour version with a resolution of 720 x 550. In the latter display, each pixel is composed of a square of four LCD elements, one each of red, green, blue and white – giving a total of 16 different colours.

The resolution of the monochrome display is better than virtually any conventional monitor of comparable size currently on the market, and of course, consumes far less power and desk space than a conventional cathode-ray tube. Toshiba estimate that the new display will appear on a laptop by 1991 – but will Toshiba or IBM be the first to use it?

This does not mean that Toshiba is

abandoning gas plasma displays in its laptops – the low power screen in the new T3100SX (winners of YC's 1990 Computer of the Year) is a case in point. Plasma displays still have the edge over LCD when it comes to speed, however – mouse pointers do not 'submarine' (disappear) when they are moved across the screen as they are apt to do on LCD screens. Toshiba says that it is committed to both display technologies, and will let the market choose which type of display it prefers.

ULSI stands for ultra large-scale integration, which is the next level of integration in microelectronics after the LSI and VLSI technologies which are currently used in manufacturing chips for present-day computers. Of course, as levels of integration in chips increase, the size of the features in these chips becomes smaller, and quality control and cleanliness must increase correspondingly if the chips are to stand any chance of working at all.

A large class-10 clean room (an environment in which a cubic metre of air has no more than 10 suspended particles above a specified size) is the heart of the Company's ULSI research program, where prototype quantities of 16 megabit DRAM chips are being manufactured and tested. Toshiba has also developed an *electron beam direct writing* technique for the manufacture of chips with features as small as a quarter of a micron (one four-thousandth of a millimetre). This sort of accuracy is needed for the next generations of RAM chips (64- and 256 megabit).

A high speed GaAs shift register operat-



Dynabook computers (the Japanese version of the T1000SE) on the production line at Ome, undergoing final checks before being packaged for despatch.

ing at a clock speed of 1.25 gigahertz (that's about 38 times the speed of the fastest micros in PCs at the moment), which was also developed here, opens up enormous possibilities in the super-computer field, with its insatiable appetite for ever-increasing speed to perform increasingly complex simulations of real-world events such as weather patterns. Such supercomputers are vital to predicting effects like the much publicised greenhouse effect, and the more powerful the computer, the more accurate the model can be made.

One project which will interest anybody who has ever tried to scan text into a computer is the ExpressReader intelligent OCR system. Capable of automatically reading typewritten or typeset text from 6 to 60 point size, in virtually any font, without the usually tedious training process most OCR systems require. The system outputs the text as ASCII or virtually any wordprocessing format at a rate of about 60 characters per second, with a specified accuracy of up to 99.7 per cent. A RISC-based image processor card plugs into the expansion slot of a standard PC, and a SCSI scanner connects to the card. In the future, TIFF image will be able to be fed to the card from the computer, so that the scanner need not be connected to ExpressReader card, but can be located elsewhere. The system automatically determines the number of columns on the

page, and ignores any picture on the page.

Toshiba is also a leader in the development of ISDN-compatible PBXs (private branch exchanges) and video telephones. However, Toshiba does not see the present ISDN system having much impact on domestic telecommunications, but rather is targeted at meeting the demands of medium to large corporate users. The company does not see domestic communications changing much for the next 15 or 20 years, until a wideband integrated service is introduced using fibre optics, to allow video-bandwidth signals to be transmitted by cable as well.

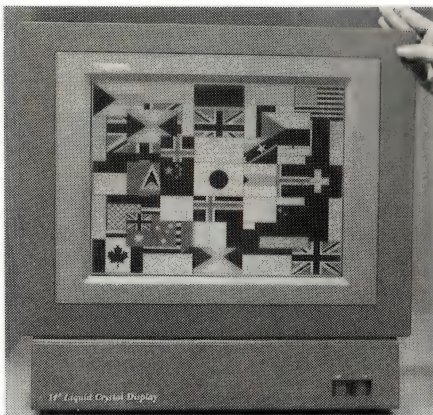
The company recently licenced the Sparc technology from Sun Microsystems (one of the leading workstation manufacturers), and is currently marketing its own Sparc-based system in Japan. However, Toshiba is also considering marketing a low-end Sparc-based workstation on a global scale.

One of the advantages of having manufacturing interests as diverse as this is that developments in one field can have unexpected spin-offs in other areas. A good example is the high-resolution LCD screens which have obvious applications in both computing and television displays.

Toshiba are not only developing new and better ways of using electricity, but are also active in research relating to power generation. Toshiba is the largest supplier of equipment for nuclear power stations in Japan, and is actively engaged in research into breeder reactor technologies and nuclear fusion. On a smaller scale, research is also being conducted into fuel cells and even into small scale storage batteries. If current research proves successful, it could mean a doubling in the storage capacity of batteries in appliances such as laptops.

The company is also a leading researcher into high-temperature superconductors, which promise to revolutionise fields as diverse as mass transit (with magnetic levitation), power generation, and medicine (Cat scanners rely on superconducting magnets for their operation).

So, while much of this has little or nothing to do with laptops, many of the components which go into Toshiba's laptops are not only made by the same company as the machine itself, but have probably been developed by Toshiba as well. The sheer scale of the operations means that their designers can start with a concept for a machine, and then design the components for it, rather than designing a machine around already existing parts. □



High resolution full-colour display is possible with this backlit active-matrix LCD, jointly developed by Toshiba and IBM Japan. Future applications include not only laptop screens, but flat screen televisions, which can be hung on the wall like a painting.

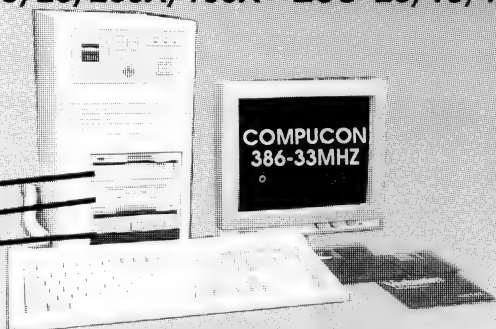


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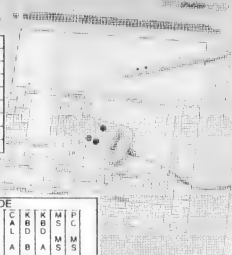
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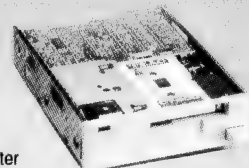
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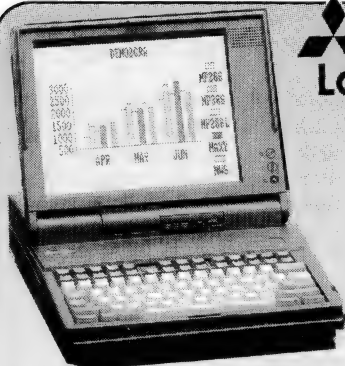
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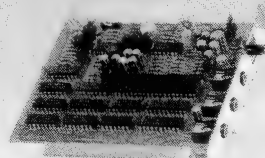
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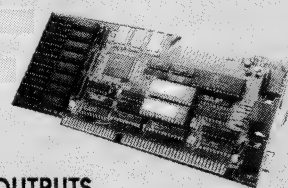
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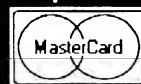
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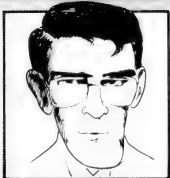
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BBS Twits

NO, I AM not going to talk about users again, it is a fact of life that some users do not appreciate the systems that they use! I am going to prattle about the absolute scourge of the Bulletin Boards – The Twit System Operators.

How do you know when you have a Twit System Operator on your hands? Some times it is not easy, others stand out like pimples on a pumpkin. Read some of the messages that the SysOp leaves around the place. Most Twit SysOps are BBS junkies – they just have to log on to every Bulletin Board in the universe, and worse, still they just have to leave a message. It doesn't matter what the subject is, whether they have something to say or even whether they can write anything intelligent, they will have to post a message.

It is sad to say that there are a considerable number of them around, you must protect yourself from them! Firstly, do not use the same password on multiple systems. The Twit SysOp may try to use your password on other systems that you use. The messages will definitely be in bad taste and will totally ruin your reputation.

The Twit SysOp is also likely to do strange things to you while you use their Bulletin Board System. Some of the stories include the ones that will lift up the telephone while you are online and sometimes even make noises, others will cause the modem to disconnect or other ugly actions. One cute one is the 'maze' style areas, this is where no matter what you type, strange things happen. The Twit SysOp will justify these actions on the basis that

Twit SysOps lock out users because of a difference of opinion such as politics, religion and so on.

they only do it 'to people that they do not like', cute people, or the other excuse is 'Oh, I was only having a little fun'.

Simply, with all the things that go wrong with Bulletin Board communications, it is bad enough already. By that I mean bad lines, carrier drop outs, machine problems and the like. Good systems will tell you up front if your access is terminated or that you have done something to cause the System Operator to be annoyed with you. The Twit SysOp is just a coward (in this case) hiding behind his system.

Twit SysOps will change your password to stop you logging on rather than advise you that you have breached their access requirements or otherwise offended them.

Thanks to the Black Hole BBS, I have some other attributes of the Twit SysOp. They lock out users because of a difference of opinion such as politics, religion and so on. Twit SysOps feel that

Complete BBS Registry Listing

WE PUBLISH THE COMPLETE listing for the ACT and New South Wales in July, October, January and April; the listing for Victoria, Tasmania and the Northern Territory in August, November, February and May; and South Australia, Western Australia and Queensland in September, December, June and March.

Registration of Bulletin Boards are only accepted electronically at the primary electronic collection points – please address all enquiries through them.

locking out the user is the best way to explain his views and to show the user the error in his ways. They demand user fees prior to letting a user view the contents and functions of his board, and feel that if he is demanding money for access, then the user should know that the board is a great board and should pay the fee, sight unseen.

Leaving the phone off the hook

BUT THEY NEVER admit that their boards have vacant or unused slots (that is, the system is fully utilised by callers). To avoid embarrassment, they take the phone off the hook so as to make it look busy and real active to potential users.

Vivid adult graphics are used on Twit SysOps' opening screens for all to see. They laugh at the fact that some adolescents spend hours fantasizing over the graphics before them.

And, one thing Twit SysOps never do is offer assistance to other SysOps. They are very protective of their boards and will not do anything to help their competition. When help is requested by another SysOp, the Twit SysOp simply ignores the request. Also, they do not offer visiting SysOps status to other SysOps. They feel that if other SysOps want access, then they should pay like everyone else. But, when visiting other boards, the Visitor SysOp status is requested every time.

They have lots of close friends (hard to believe) who they have made Co-SysOp of their board. These Co-SysOps have no function on the Twit SysOps board but it enables them to gain Visitor SysOp status on all the boards in town, and escape any users fees or ratios.

Twit SysOps will only operate a board one or two hours a day in order to obtain Visitor SysOp status on other boards. The Twit SysOps board usually only has one or two functions, and is not a serious attempt to operate a BBS. They totally ignore 300 baud callers (or 1200, 1200/75 and some even 2400). They feel that all users should have faster communications hardware available. They do not consider the fact that some users do not have the financial resources to buy faster modems, or have received the modem as a gift which they are not yet able to replace.

Twit SysOps love to break in and demand that the user drop

carrier so that they can use the phone to make that life saving call to Pizza Hut for a delivery.

Invasion of privacy

WHILE WE ARE on the topic of Twit SysOps, another invasion of privacy is being thrust upon us. No, not the government, but a bunch of well meaning SysOps (well meaning do-gooders tend to be the worst don't they?). What they plan is a systematic exchange of the most private information you give a Bulletin Board System – your *password* !

The reason for doing this, is to stop users having the same password on multiple systems. Each Bulletin Board System will send details of their users' name and password to a central coordinator who will then match the information and report on possible duplicates. Granted, the information will be checksum-ed and encrypted, but that will still put an enormous database of personal information in the hands of a few people that could be seriously misused.

All this is because some Bulletin Board Software is prone to break-ins, and the other great risk being the Twit SysOp. Well, unfortunately, I believe that the security of a user's password belongs solely to the user in question. If I want to use the same password on every system (and by the way, I use a totally different, randomly generated, password on every system I use) then that is the choice of the user.

At the very least, I hope that all the systems that invade user's rights this way will inform them of what they are doing – that way you can avoid them like the plague. Next thing you know, they will be exchanging the registration information you supply to stop people logging on with false names! Heck, if Canberra tried this, the civil liberties guys would have a field day! □

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(02) 628 5222

Vic. – Custom Programming
Opus (03) 848 3331

Qld. – AMPAK Opus/PRBBS
(07) 263 7070

SA – Oracle PC-Network
(08) 260 6222

WA – Nemo Multiple BBS
RAPL
(09) 370 1855

Tas. – Hobart Users Bulletin
Board (002) 43 5041

BBS Listing 9001

Sun 7 Jan 1990
New systems: 17
Online: 8
Unknown: 5
Offline: 12
Name Change: 7

Amended: 27
Total Systems: 394

QUEENSLAND

Access Australia BBS
Sysop: William Brackenridge
Phone: (07) 284-6990
FIDOnet: 3:640/207
Baud: V21 V22 V22bis
Access: Public

Access North Queensland
Phone: (070) 51-0566
Baud: V21 V22 V23
Access: Reg LVA
Computer: IBM XT Clone
DOS: MS DOS
BBSSoftware: CMVideoTeX

AMPAK NorthGate/PRBBS
Sysop: Brian Wendt
Phone: (07) 263-7070
FIDOnet: 3:640/205
Baud: V21 V22 V22bis V23 V32 PEP
Access: Public
Computer: PROFOUND 386/25
DOS: MS DOS
BBSSoftware: Opus

Apple-Q Node 1
Sysop: Vince Crosdale
Phone: (07) 851-1711
Baud: V21 V22 V22bis V23
Access: Mem
Computer: Apple //e

BBSSoftware: GBBS PRO

Blue Lagoon BBS - QLD
Sysop: David Webb
Phone: (07) 343-9353
FIDOnet: 3:640/943
Baud: V21 V22 V22bis V23
Access: Public
Computer: Amstrad PC1640DD
DOS: MS DOS
BBSSoftware: QuickBBS / Opus

Commodore Computer Users Group Qld
Sysop: Graeme Darroch
Phone: (07) 808-7694
FIDOnet: 3:640/304
Baud: V21 V22 V22bis V23 V32
Access: Mem Reg VA
Computer: IBM XT
DOS: MS DOS
BBSSoftware: Opus

COMTEL BBS
Sysop: Warren Mason
Phone: (077) 89-1655
FIDOnet: 3:640/740
Baud: V21 V22 V22bis V23 B103 B212
Access: Mem LVA
Computer: FUJITECH ST
DOS: MS DOS
BBSSoftware: Lynx

Contention BBS
Sysop: Gregory Bradley
Phone: (077) 73-7524
FIDOnet: 3:640/720
Baud: V21 V22 V22bis V23
Access: Reg
Hours: Daily: 2300 - 0600
Computer: IBM Clone
DOS: MS DOS
BBSSoftware: Opus

ECLECTIC EMPIRE
Sysop: Tony Smith
Phone: (077) 74-1190
FIDOnet: 3:640/701
Baud: V22 V22bis
Access: Reg LVA
Hours: 2030 - 0830 daily
Computer: IBM XT
DOS: PC DOS
BBSSoftware: Dutchie

EDUCATIONAL BBS
Sysop: Andrew Waddell
Phone: (07) 266-3369
Baud: V21 V22 V22bis V23 V32
Access: Mem VA
Computer: IBM XT clone
BBSSoftware: Mailbox

Electric Dreams BBS
Sysop: Joe Altoff
Phone: (07) 399-1322
Baud: V21 V22 V23
Access: Mem VA

ESE ESCAPE BBS
Sysop: Mark Garlipp
Phone: (07) 371-4403
FIDOnet: 3:640/371
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM 386 SX Clone

DOS: MS DOS
BBSSoftware: OPUS

FAR-NOR-64 BBS
Sysop: Ian Pearse
Phone: (070) 54-6892
Baud: V21 V22 V23 B103 B212
Access: Mem Reg LVA
Computer: C-64
DOS: BASIC IEEE
BBSSoftware: BBS64

Galaxy Mail Dispatch
Sysop: James Collins
Phone: (07) 207-9316
FIDOnet: 3:640/316
Baud: V21 V22 V22bis V23 PEP
Access: Reg LVA
Computer: IBM AT Clone
DOS: MS DOS
BBSSoftware: Lynx, OPUS, QuickBBS
Note: Press RETURN to select BBSSoftware

Genius BBS
Sysop: Jeremy Howell
Phone: (07) 870-2819
FIDOnet: 3:640/486
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM XT Clone
DOS: MS DOS
BBSSoftware: QuickBBS

GOLD COAST Bulletin Board.
Sysop: Glenn Dawson
Phone: (075) 39-1732
FIDOnet: 3:640/935
Baud: V21 V22 V22bis V23 B103 B212
Access: Mem LVA
Computer: Star 10 XT IBM clone
DOS: MS DOS
BBSSoftware: QuickBBS

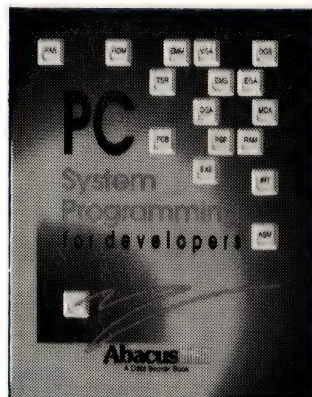
Grammar BBS
Sysop: Barry Taylor
Phone: (077) 72-6052
FIDOnet: 3:640/702
Baud: V21 V22 V22bis V23 V32
Access: Reg LVA
Computer: IBM XT Clone
DOS: MS DOS
BBSSoftware: Opus

Greenhorn Experimental - Brisbane ?!
Sysop: Mike Richardson
Phone: (07) 208-7663
FIDOnet: 3:640/301
Baud: V21 V22 V22bis V23 PEP
Access: Mem LVA
Computer: CCS 386
DOS: MS DOS
BBSSoftware: QuickBBS

Gumtree BBS
Sysop: Peter Brewer
Phone: (075) 63-2621
FIDOnet: 3:640/601
Baud: V22 V22bis
Access: Mem Reg
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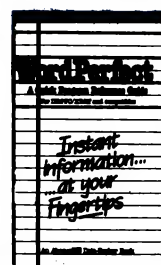
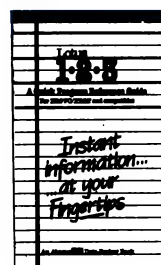
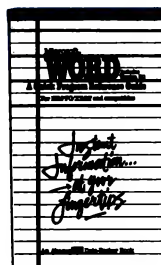
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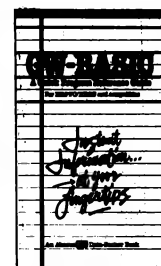
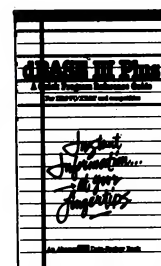
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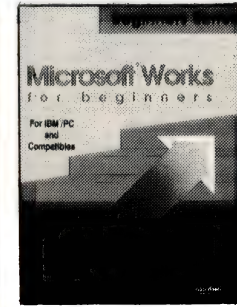
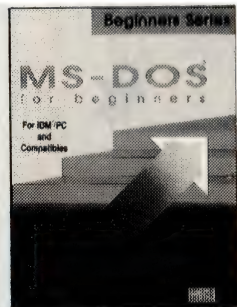
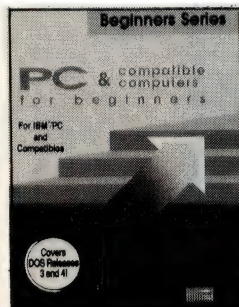
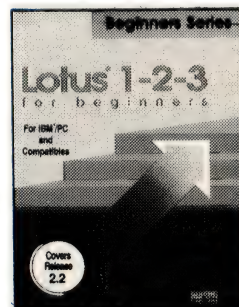
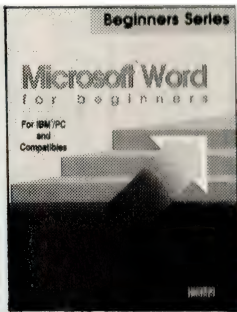
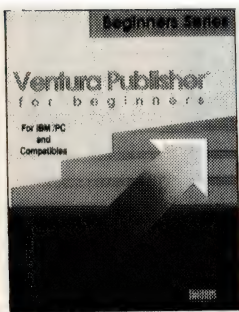
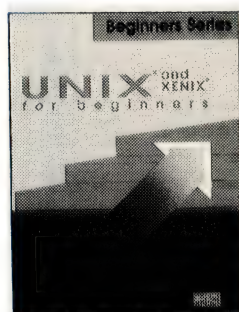
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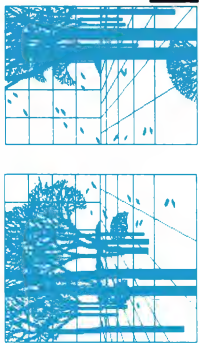
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Access: Reg LVA
Hours: Weekdays: 2000 - 0600-
Weekends: 2000 - 0800
Computer: Apple
DOS: ProDOS
BBSSoftware: GBBS

LANAI

Sysop: Ray Nugent
Phone: (075) 92-1947
FIDOnet: 3.640/921
Baud: V21 V22 V22bis V23
Access: Public
Computer: 386 MAX
DOS: MS DOS
BBSSoftware: QuickBBS

Listline Experimental

Phone: (07) 353-3718
Baud: V21 V23

Mackay High School BBS

Sysop: Bob Chalmers
Phone: (079) 51-4815
Access: Public
Hours: Weekdays: 1600 - 0730-
Weekends: 24 Hours

Marlin-Coast BBS

Sysop: Ray Chalmers
Phone: (070) 57-7658
FIDOnet: 3.640/501
Baud: V22 V22bis B103 PEP
Access: Reg VA
Computer: Pericomp 386/20
DOS: MS DOS
BBSSoftware: Opus

Marwick's MadHouse

Sysop: Paul Marwick
Phone: (07) 371-5864
FIDOnet: 3.640/820
Baud: V22 V22bis PEP
Access: Mem VA
Computer: Skai 386/20
DOS: MS DOS
BBSSoftware: Opus

Mel-Born BBS ?2

Sysop: Wade Short
Phone: (075) 52-0875
FIDOnet: 3.640/754
Baud: V21 V22 V23
Access: Public
Hours: Daily: 1900 - 0700
Computer: Cleveland 286
DOS: MS DOS
BBSSoftware: Opus

Modem Magic

Sysop: John Wain
Phone: (07) 264-4747
FIDOnet: 3.640/212
Baud: V21 V22 V22bis V23
Access: Reg VA
Computer: IBM 386 Clone
DOS: MS DOS
BBSSoftware: Opus

Nightlife QuickBBS

Sysop: Jonathan and Gillian Levine
Phone: (071) 849-5927
FIDOnet: 3.640/349
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM XT Clone
DOS: MS DOS
BBSSoftware: QuickBBS

NQ Connection

Sysop: Geoff Gordon
Phone: (077) 79-7660
FIDOnet: 3.640/710
Baud: V22 V22bis PEP
Access: Reg VA
Computer: Kaypro XT
DOS: MS DOS
BBSSoftware: Opus

Phoenix BBS

Sysop: Kelvin Sagers
Phone: (07) 800-4660
Baud: V21 V22 V22bis V23
Access: Mem

Redcliffe Library

Sysop: Andrew Osborne
Phone: (07) 283-0315
FIDOnet: 3.640/203
Baud: V21 V22 V22bis V23 B103
B212 PEP
Access: Reg VA
Hours: Weekdays: 1700 - 0800-
Weekends: 24 Hours
Computer: Hyundai AT
BBSSoftware: Opus

Rock Cave BBS

Sysop: Rick Dalley
Phone: (07) 395-1809
Baud: V21 V22 V22bis V23
Access: Mem VA
Computer: IBM XT clone
DOS: MS DOS
BBSSoftware: Mailbox

Sidecar Express BBS

Sysop: Brendan Pratt
Phone: (075) 46-3252
Baud: V21 V22 V22bis V23 V32
Access: Mem LVA
Computer: Amiga Sidecar
DOS: MS DOS
BBSSoftware: MailBox

Silicon City Brisbane BBS

Sysop: Silicon City
Phone: (07) 391-6176
FIDOnet: 3.640/391
Baud: V21 V22 V22bis V23
Access: Public
Computer: ULTRA AT
DOS: MS DOS
BBSSoftware: Opus
Note: Now Called Silicon Data BBS

SILICON DATA BBS

Sysop: Bruce Cifuentes
Phone: (07) 391-6176
FIDOnet: 3.640/391
Baud: V21 V22 V22bis V23
Access: Public
Computer: ULTRA AT
DOS: MS DOS
BBSSoftware: Opus

Software 80 BBS

Sysop: Tony Melius
Phone: (07) 369-7103
Baud: V21
Access: Reg VA
Hours: Weekdays: 1930 - 0800Sat:
1430 - Mon: 0800

Sun Central BBS

Sysop: David Sonter
Phone: (07) 890-1453
FIDOnet: 3.640/390
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM Clone
DOS: MS DOS
BBSSoftware: Lynx
Note: Registration required for full access

Sunshine Coast Connection

Sysop: Brian Boseley
Phone: (071) 44-2889

FIDOnet: 3.640/401

Baud: V21 V22 V22bis V23
Access: Public
Hours: Mon - Sat: 2000 - 0800Sun:
24 Hours
Computer: IBM AT Clone
DOS: MS DOS
BBSSoftware: Opus

Swiss Connection

Sysop: Andrew Osborne
Phone: (07) 283-0314
FIDOnet: 3.640/204
Baud: V21 V22 V22bis V23
Access: Reg VA
Computer: IBM AT
BBSSoftware: Opus

The Centre Baud

Sysop: RAM
Phone: (07) 368-1239
FIDOnet: 3.640/378
Baud: V21 V22 V22bis B103 B212
Access: Reg LVA
Computer: IBM AT Clone
DOS: MS DOS
BBSSoftware: Lynx

The Flying Scotsman

Sysop: Graeme Willox
Phone: (07) 297-5265
FIDOnet: 3.640/297
Baud: V21 V22 V22bis V23

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What is Shareware... and why is a Directory important?

How it works

Shareware relies upon the honesty of software users to pay for the software that they use. Shareware bypasses the costs associated with conventional marketing and promotion of software by inviting users of software to give copies of the software to their friends. If the user of the software likes the product and wants to continue to use it in any way then the user should register that software.

When a user registers the software the author gets a return for his effort in creating the software and is encouraged to improve the product and to develop new products.

Rather than implementing cumbersome copy protection schemes shareware authors do exactly the opposite — they actually encourage their users to make copies of the software for their friends.

Word would spread slowly if the author solely relied upon users just sharing copies with their friends. User groups are encouraged to share the software with their members on a non profit basis.

Many user groups set up Bulletin Boards so that members can "down load" software which they would like to evaluate for use. This is another accepted way of distributing shareware. Some commercial operations also distribute shareware and charge for the disks. Again this is an accepted way of distributing shareware providing the disk distributor meets certain criteria set down by the authors.

What is the difference between Shareware and Public Domain Software?

Public Domain software is created by authors who chose not to seek formal rights or royalties. There is no restriction of any kind on distribution of this kind of software. Most public domain software is games or utilities. There are very few complete products in the public domain.

Shareware software on the other hand is distributed so the user can evaluate the software to decide whether he will register with the author and continue to use the software.

Shareware is an alternate method of marketing software, not really a different kind of software. In fact the more successful Shareware products hold their own against their commercially distributed competitors. The greatest difference is that the Shareware product's packaging is not as fancy and the price is much lower.

Where can I obtain Shareware trial disks?

A collection of Shareware disks is usually referred to as a Library. A Library may be kept by a user group, a bulletin board operator or by a commercial diskette distributor.

A lot has been said and written about viruses. There is no doubt that a virus could be distributed hidden in a public domain or shareware disk.

Care needs to be taken that the library you use for disks takes every reasonable step to eliminate the possibility of a virus. Careful checking is not sufficient as it is simply impossible to check every single disk to the degree which would be required.

The safest way for your library to obtain Shareware disks is to source them directly from the authors. This of course means that the source of every disk is known and the insidious perpetrator of a virus cannot hide behind a cloak of anonymity.

The Shareware authors are always releasing new versions of their software and you should ensure that the library is kept up to date with the latest available versions.

Before you purchase any disks you should ask if the software and the latest versions are sourced directly from the authors. If the answer is "yes" you can be reasonably sure that you are getting the latest versions and that they should be quite safe to use.

Do I need to join a Library?

Some commercial libraries and most user groups insist that you join before you can purchase disks. If you intend to purchase disks a properly prepared catalogue will make your selections easier and repay your membership costs many times over.

Other libraries allow purchases without any membership fees and some offer a free catalogue. The free catalogue is usually a very short description of available disks and is often given away as an insert in magazines. Of course there is no such thing as a free lunch — the brief descriptions in free catalogues mean that you will invariably purchase more disks than you really need. The descriptions are so short you really are taking a lucky dip!

What is PC-SIG?

PC-SIG is the world's largest Shareware library and contains around 1500 disks. PC-SIG does not require you to become a member to purchase disks and gives you a choice of Directories to suit your requirements.

PC-SIG are the publishers of a bi-monthly magazine, appropriately named "Shareware". The magazine lists new additions, upgrades to existing disks and compares products from different authors. "Shareware" is available at many newsagents in Australia at around \$4.50 an issue or on a twelve month subscription basis for \$20. Subscribers to "Shareware" also receive FREE a 48 page mini catalogue of the PC-SIG Library.

NEW from PC-SIG is the definitive reference work for tracking down the Shareware product you need. With nearly 500 pages of detailed descriptions of the programs in the PC-SIG Library "The Complete Encyclopedia of Shareware" provides a wealth of carefully organised information to help you find the product you are seeking. You can look up a program by subject category, title or disk number. There are even handy "see also" notations to direct you to other programs which may suit. The Encyclopedia is exceptional value at just \$32.50 (plus \$5 post and handling).

If you chose to subscribe to "Shareware" and to purchase "The Encyclopedia" you can become a member of the Library for just \$38 (plus \$5 post and handling). You will not only have the best reference work available but be kept up to date for a full 12 months with "Shareware" magazine. As a further bonus members are offered special discounts from time to time.

You do not need to be a member of the Library to purchase PC-SIG disks. Five disks are just \$50 and then additional disks are just \$5 each.

Libraries often represent that they offer PC-SIG disks BUT unless the disks are grey and carry PC-SIG's logo they are not genuine PC-SIG disks. PC-SIG cannot take any responsibility or offer support nor the money back guarantee on such disks. Invariably these libraries do not bother updating to the latest version at all, or at best they will update from time to time so they can claim that they do update.

To ensure that the library contains the best quality products no disk is added to the PC-SIG Library unless it is obtained directly from the author. There can be no anonymous interference with PC-SIG disks!

Are registered Shareware copies available in Australia?

PC-SIG's distributor in Australia, Manacomm, offers the full PC-SIG library and also has arrangements with many Shareware authors to represent them in Australia. Yes, the complete registered packages with manuals and access to upgrades are available right here in Australia. If you return the PC-SIG Shareware disk when investing in a registered copy you will be refunded \$5 per disk.

This means that the trial could be at no cost if you decide to continue to use the product.

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- ☐ I would prefer to become a member and save \$14.50 and subscribe to "Shareware" magazine and receive "The Encyclopedia of Shareware" as well as the free mini catalogue. All for just \$38 (plus \$5 p&h).
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NATIONAL BBS LISTING

Access: Reg VA
Computer: Hyndai 16T
DOS: MS DOS
BBSSoftware: OPUS

The Galaxy GateWay Computer System

Sysop: James Collins
Phone: (07) 207-8900
FIDOnet: 3:640/230
Baud: V21 V22 V22bis V23
Access: Reg LVA
Computer: IBM AT Clone
DOS: MS DOS
BBSSoftware: Lynx, OPUS, BBS
Note: Press RETURN to select
BBSSoftware

The Lian's Den

Sysop: Yvette Lian
Phone: (07) 300-1152
FIDOnet: 3:640/352
Baud: V22 V22bis V23
Access: Public
Computer: President 286
DOS: MS DOS
BBSSoftware: QuickBBS

THE LIGHTHOUSE BBS

Sysop: Jason Trump
Phone: (071) 91-1167
Baud: V21 V22 V22bis V23 V32
Access: Mem Reg VA
Computer: CCS XT
DOS: MS DOS
BBSSoftware: GTPower

The Missing Link CIBS

Sysop: Mike Barber
Phone: (07) 808-3094
FIDOnet: 3:640/808
Baud: V21 V22 V22bis B212 PEP
Access: Public
Computer: 2 x XT's on LAN
DOS: MMS DOS
BBSSoftware: Lynx

Toowoomba RBBS

Sysop: Chris White
Phone: (076) 30-1762
Baud: V21
Access: Mem Reg LVA
Hours: Daily: 2100 to 0630
Computer: C-128

Townsville Apple Bulletin Board

Sysop: Christopher Griggs
Phone: (077) 73-3651
Baud: V21 V22 V23 B103 B212
Access: Mem Reg LVA
Computer: Apple //e
DOS: ProDOS
BBSSoftware: GBBS

Transcendental Connection

Sysop: Kenneth Page
Phone: (07) 281-9418
Baud: V21 V22 V22bis V23
Access: Reg VA
Computer: C-64
BBSSoftware: BBS64

XENTEK

Sysop: Ken Speakman
Phone: (07) 807-4808
Baud: V22 V22bis
Access: Public
Computer: Intel 386

DOS: SCO XENIX
BBSSoftware: XBBS

SOUTH AUSTRALIA

ADAM

Sysop: Greg Hicks
Phone: (08) 370-5775
FIDOnet: 3:680/805
Baud: V21 V22 V22bis V23 V32 HST
Access: Reg LVA
Computer: IBM 386/25 Clone
DOS: MS DOS
BBSSoftware: TBBS

Amiga Computer Entertainment (ACE) BBS

Sysop: Greg Parr
Phone: (08) 266-3055
Baud: V21 V22 V22bis V23
Access: Reg LVA
Computer: Amiga 1000
DOS: AmigaDOS
BBSSoftware: SKYLINE

Australian BBS Registry

Sysop: Rodney Creer
Phone: (08) 281-0433
FIDOnet: 3:680/808
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM XT Clone
DOS: PC DOS
BBSSoftware: QuickBBS

AVMUG

Sysop: Sean Donaghy
Phone: (08) 232-0944
Baud: V21 V22 V22bis V23
Access: Public
Computer: Macintosh Plus
DOS: HFS
BBSSoftware: Nova Link

BLACK Vold - Lair Of ChAm-PIOnS

Sysop: Plombardian
Phone: (08) 388-5702
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM Clone
DOS: MS DOS
BBSSoftware: QuickBBS

Coffee Time BBS

Sysop: Terry Mulvaney
Phone: (08) 254-9423
FIDOnet: 3:681/860
Baud: V21 V22 V22bis V23
Access: Reg LVA
Computer: IBM XT Clone
DOS: MS DOS
BBSSoftware: Opus

Computer Connection

Sysop: Ray & Vicki Crawford
Phone: (08) 384-7316
FIDOnet: 3:680/809
Baud: V21 V22 V22bis V23
Access: Public
Hours: Daily: 1730 - 0900
Computer: IBM XT Clone
DOS: MS DOS
BBSSoftware: Opus

Computer Talk

Sysop: Bruce Kelly & John Rowe
Phone: (08) 272-9177
FIDOnet: 3:680/816
Baud: V21 V22 V22bis V23
Access: Mem LVA
Computer: IBM 386 Clone
DOS: MS DOS
BBSSoftware: Searchlight

Full Metal Straitjacket

Sysop: Alastair Rankine
Phone: (08) 272-2291
FIDOnet: 3:680/820
Baud: V21 V22 V22bis V23 V32
Access: Public
Computer: Compaq 386
DOS: MS DOS
BBSSoftware: QuickBBS

Jaqes Cousteau's UnderWater BBS

Sysop: Crispin Harris & Garth Kidd
Phone: (08) 377-0695
FIDOnet: 3:680/813
Baud: V21 V22 V22bis V23
Access: Mem Reg LVA
Computer: IBM 386 SX Clone
DOS: MS DOS
BBSSoftware: QuickBBS

Midnight Caller

Sysop: John Buetefer
Phone: (08) 281-2094
FIDOnet: 3:680/818
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM XT Clone
DOS: MS DOS
BBSSoftware: QuickBBS

Multiple System BBS

Sysop: Danny Vozzo
Phone: (08) 255-5116
Baud: V21 V22 V22bis V23
Access: Reg LVA
Computer: Apple //+
DOS: Apple DOS
BBSSoftware: GBBS

Nexus Education Dept BBS

Phone: (08) 243-2477
Baud: V21
Access: Mem

Northern Districts Computer Club Inc.

Sysop: Kym Gotch
Phone: (08) 341-5161
Baud: V21 V22
Access: Mem VA
Hours: Sat: 0900 - Fri: 0900
Computer: IBM XT Clone
DOS: MS DOS
BBSSoftware: Wildcat

Oracle PC-Network

Sysop: Don Crago & Grayham Smith
Phone: (08) 260-6222
FIDOnet: 3:680/804
Baud: V21 V22 V22bis V23
Access: Mem LVA
Computer: IBM 386 Clone
DOS: PC DOS
BBSSoftware: TBBS

Phone Box BBS

Sysop: Darryl Merritt

Phone: (08) 380-5505
FIDOnet: 3:681/854
Baud: V21 V22 V22bis V23 V32
Access: Public
Computer: Kaypro AT
DOS: MS DOS
BBSSoftware: Opus

S A C BBS

Sysop: Austen Evans
Phone: (08) 322-2618
Baud: V21 V22 V23 V23ORG B103 B212
Access: Mem LVA
Computer: C-128
BBSSoftware: Blue Board

SA Computer Service BBS

Sysop: Rod Taylor
Phone: (08) 242-1798
Baud: V21 V22 V22bis V23
Access: Public
Hours: Weekdays: 1800 - 0800-
Weekends: 24 Hours
Computer: Premier 386 33mhz
DOS: MS DOS
BBSSoftware: Wildcat

SA Country CLUB

Sysop: Martin Crockett
Phone: (085) 22-4434
FIDOnet: 3:681/853
Baud: V21 V22 V22bis V23 V32
Access: Public
Computer: IBM AT Clone
DOS: PC DOS
BBSSoftware: Opus

Saturn V

Sysop: Chris Kilgariff
Phone: (08) 364-2302
FIDOnet: 3:680/824
Baud: V21 V22 V22bis V23
Access: Public
Hours: Daily: 1200 - 0200
Computer: IBM XT Clone
DOS: MS DOS
BBSSoftware: QuickBBS

Sorcerer Users Group BBS

Sysop: Steve Fraser
Phone: (08) 260-6576
Baud: V21
Access: Mem LVA
Computer: Pulsar LBB
DOS: CP/M
BBSSoftware: ROS

Talisman BBS

Sysop: Karl Bridger
Phone: (08) 281-0068
FIDOnet: 3:681/856
Baud: V21 V22 V22bis B103 B212
Access: Public
Computer: IBM XT Clone
DOS: MS DOS
BBSSoftware: QuickBBS

TAN80 BBS

Sysop: Erik Rasmussen
Phone: (08) 386-0932
FIDOnet: 3:680/822
Baud: V21 V22 V22bis V23
Access: Public
Hours: Weekdays: 1800 - 0800-
Weekends: 1200 - 0800
Computer: IBM XT Clone

NATIONAL BBS LISTING

DOS: MS DOS
BBSSoftware: Opus

The Bureau BBS

Sysop: Patrick Browne
Phone: (08) 258-2002
OZnet: 7.833/384
Baud: V22 V22bis
Access: Reg VA
Computer: Kaypro XT
DOS: MS DOS
BBSSoftware: Opus

The Key Board

Sysop: Paul Lawrence
Phone: (08) 344-5354
FIDOnet: 3.681/858
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM Clone
DOS: MS DOS
BBSSoftware: Opus

The Phoenix BBS

Sysop: Scott Amerland
Phone: (086) 73-7041
FIDOnet: 3.680/817
Baud: V21 V22 V22bis V32 HST
Access: Public
Computer: IBM 386 Clone
DOS: MS DOS
BBSSoftware: QuickBBS

The Realm

Sysop: Matt Rubinstein
Phone: (08) 374-0462
Baud: V21 V22 V22bis V23 V32
Access: Public
Computer: Acorn Archimedes
DOS: RISCOS
BBSSoftware: The Realm

Trivia BBS

Sysop: Daron Ryan
Phone: (08) 377-1067
Baud: V21 V22 V22bis V23
Hours: Weekdays: 1800 - 0800-
Weekends: 24 Hours
DOS: MS DOS
BBSSoftware: QBBS

Typelink SA

Sysop: Kathy Fraser
Phone: (08) 211-8510
Baud: V22 V22bis
Access: Reg
Computer: IBM AT Clone
DOS: MS DOS
BBSSoftware: Opus

WESTERN

AUSTRALIA

Blood & Silicon BBS

Sysop: Jason Hay
Phone: (09) 388-2700
Baud: V21 V22 V22bis V23 B103
B212
Access: Reg LVA
Computer: ALR 386/220
DOS: MS DOS
BBSSoftware: The Major BBS

CITADEL BBS

Sysop: Adam Blake
Phone: (09) 367-8856

FIDOnet: 3.690/632
Baud: V21 V22 V23
Access: Public
Computer: IPEX AT Turbo
DOS: MS DOS
BBSSoftware: QuickBBS

Galaxy Alliance

Sysop: Justin Twiss
Phone: (09) 430-5760
FIDOnet: 3.690/634
Baud: V21 V22 V22bis
Access: Reg LVA
Computer: NYLAP 286 Laptop
DOS: PC DOS
BBSSoftware: QuickBBS

Gamma Istari

Sysop: Richard Dale
Phone: (09) 493-1534
FIDOnet: 3.690/626
Baud: V21 V22 V22bis V23 B103
B212
Access: Mem LVA
Computer: IBM AT
DOS: MS DOS
BBSSoftware: Opus

GOLDFIELDS Opus

Sysop: Graham Clark
Phone: (090) 21-7755
FIDOnet: 3.690/643
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM XT Clone
DOS: MS DOS
BBSSoftware: Opus

Hedland's First Bulletin Board

Sysop: Wayne Wessling
Phone: (091) 73-2275
FIDOnet: 3.690/644
Baud: V21 V22 V22bis V23 PEP
Access: Reg
Computer: Epson PC+
DOS: MS DOS
BBSSoftware: Opus

Lightning BBS

Sysop: Simon Blears
Phone: (09) 275-8225
FIDOnet: 3.690/601
Baud: V22 V22bis PEP
Access: LVA
Computer: Compaq 386s
DOS: Compaq DOS
BBSSoftware: Opus
Note: V21 B103 is NOT supported

Mini Omen

Sysop: Greg Watkins
Phone: (09) 279-8555
Baud: V21 V22 V23
Access: Public
Computer: TRS-80
DOS: NewDos
BBSSoftware: Omen

Murdoch University ES-BBS1

Sysop: Roger Atkinson
Phone: (09) 332-2604
Baud: V21
Access: Mem VA
Computer: Commodore 128D
DOS: CP/M
BBSSoftware: Turbo BBS

Nemo Games Machine

Sysop: Graeme Platt
Phone: (09) 370-2666
Baud: V21 V22 V22bis V23
Access: Mem LVA
Computer: Apple //e
DOS: ProDOS
BBSSoftware: GBBS Pro

Nemo Multiple BBS RAPL

Sysop: Graeme Platt
Phone: (09) 370-1855
Baud: V21 V22 V22bis V23

Paragon Computers BBS

Sysop: Paul Reeves Steve Quartely
Chris Parker
Phone: (09) 325-5160
Baud: V21 V22 V22bis V23
Access: Public
Computer: Atari ST
DOS: Gem
BBSSoftware: Michtron

Pegasus Entertainment System

Sysop: Michael Russell
Phone: (09) 345-2902
FIDOnet: 3.690/621
Baud: V21 V22 V22bis V23
Access: Public
Computer: Epson PC
DOS: MS DOS
BBSSoftware: RBBS-PC

Perth Omen

Sysop: Mark Dignam
Phone: (09) 244-2111
Baud: V21 V22 V22bis V23 V23ORG
Access: Mem Reg
Computer: TRS-80
DOS: NewDOS
BBSSoftware: Omen TRBBS

Pro-Nemo

Sysop: Graeme Platt
Phone: (09) 370-3333
Baud: V21 V22 V22bis V23
Access: Reg VA
Computer: Apple //e
DOS: ProDOS
BBSSoftware: ProLine

RemoteAccess HQ

Sysop: Andrew Milner
Phone: (09) 389-8048
FIDOnet: 3.690/625
Baud: V21 V22 V22bis V23
Access: Reg VA
Computer: IBM AT Clone
DOS: MS DOS
BBSSoftware: RemoteAccess

Split Infinity

Sysop: David Sparrow
Phone: (09) 309-1368
FIDOnet: 3.690/614
Baud: V21 V22 V22bis V23
Access: Public
Hours: Weekdays: 2200 - 1700-
Weekends: 2000 - 1300
Computer: IBM XT Clone
DOS: PC DOS
BBSSoftware: QuickBBS

The Bombay Duck

Sysop: Steve Hodges
Phone: (091) 44-2253
FIDOnet: 3.690/641

Baud: V21 V22 V22bis V23 B103
B212

Access: Mem Reg LVA
Computer: Comsys XT
DOS: MS DOS
BBSSoftware: Opus

The Codiac Republic BBS

Sysop: Simon Shaw
Phone: (09) 481-2139
FIDOnet: 3.690/623
Baud: V21 V22 V22bis V23
Access: Reg
Hours: Weekdays: 1700 - 0800-
Weekends: 24 Hours
Computer: Compaq 386/25
DOS: CompaqDOS
BBSSoftware: Opus

The Gathering BBS

Sysop: Ken Peters
Phone: (09) 272-4711
FIDOnet: 3.690/630
Baud: V21 V22 V22bis V23
Access: Reg VA
Computer: IBM AT Clone
DOS: MS DOS
BBSSoftware: RemoteAccess

The Library BBS

Sysop: Colin Wheat
Phone: (09) 293-2857
FIDOnet: 3.690/613
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM AT
DOS: MS DOS
BBSSoftware: Opus

The TurboBBS

Sysop: Tony Salmeri
Phone: (09) 331-1695
Baud: V21 V22 V22bis V23 B103
B212
Access: Reg LVA
Computer: IBM AT Clone
DOS: MS DOS
BBSSoftware: TurboBBS

Treasure Island

Sysop: Gloria Platt
Phone: (09) 271-0471
Baud: V21 V22 V22bis V23
Access: Reg VA
Computer: Apple //e
DOS: ProDOS
BBSSoftware: GBBS Pro

West-Gate BBS

Sysop: Phil van Leen
Phone: (09) 481-0489
FIDOnet: 3.690/640
Baud: V21 V22 V22bis V23 B103
B212
Access: Reg VA
Computer: IBM AT Clone
DOS: MS DOS
BBSSoftware: Opus

Z-Node 62

Sysop: Lindsay Allen
Phone: (09) 450-0200
Baud: V21 V22 V22bis V23
Access: Public
Computer: BigBoard II
DOS: ZCPR
BBSSoftware: Z-MSG

NEW PRODUCTS

Uniden cellular telephone

Uniden Australia

Ph: (02) 599 3355; Fax: (02) 599 7657

Price: \$1799 CP300

\$549 CC Data Interface

\$299 Scrambler

\$989 Worldport modem

Uniden's CP3000 mobile cellular telephone features hands-free operation and can be used as an answering machine with the ability to store 3 fifteen second messages or to record a 45-second memo, even while talking on the phone. The phone has 3 timers: call in progress, a resettable cumulative timer, and length of last call. Thirty numbers, 32 digits long can be stored for recall and there is a call restriction facility. Uniden also offer a Scrambler telephone and a Fax/Modem Computer Interface.

Dataplex, (03) 735 3333, recently announced that the company's Worldport 2496 fax and data modem is now compatible with the CP range of telephones. The battery powered, 2400 baud modem also supports Group III fax transmissions. Communications software is included.

Those who purchase a Uniden Cellular Telephone before April 30, 1990, in Victoria, New South Wales, Queensland and Perth have a chance to win 7-days accommodation for two at a choice of Australian resorts.

40Mb Amstrad Sprint

Babets Information

Ph: (02) 922 6511

Price: \$2399 Amstrad PPC 640 plus 40Mb Sprint

Babets are now offering a 40Mb version of the Sprint internal hard disk for the Amstrad PPC 640 portable. When mounted in place of the machine's second floppy drive (without the loss of the 2400 baud internal modem), it adds less than 70gm to the weight. Rated with a 27ms average seek time and an 880K sus-

tained data transfer rate, the unit provides for automatic error detection and correction, and auto-parking heads. For the price quoted above, Babets are also including Dos 3.3, PPC Organiser (a set of desktop utilities), Tracker (prospect/customer 'tracking' software), Mirror II (for communications), InTouch tutorial software, a half day's training and a subscription to either Viatel/Moneywatch or Telecom/Discovery. The 20Mb Sprint is still available and Babets are also offering desktop monitors, an external 5.25-inch floppy drive and a dual slot expansion.



New products?

WE ARE ALWAYS seeking new and interesting products to tell our readers about – we are particularly interested in products that would be useful to small businesses, professional offices and 'standalone' users. Please address release information to: **New Products, Your Computer, PO Box 227, Waterloo 2017 NSW**. Preference will be given to those accompanied by suitable illustrations. For inclusion in a specific month, material must be submitted 6 weeks prior to the cover date. We are also interested in the stories behind new Australian product developments – if there is a tale to your product that you would like to tell our readers, please contact Mark Cheeseman, Features Editor, on (02) 693 4143.

NEW PRODUCTS

Bytelink Plus

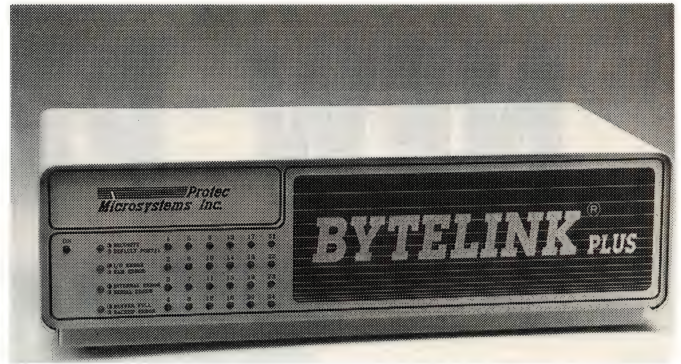
Logo

Ph: (02) 819 6811; Fax: (02) 819 6930

Price: Not supplied

Logo Distribution has added Protec's 24-port Bytelink Plus peripheral sharer to its range. Standard features include bi-directional serial ports, parallel ports that can be programmed for input or output, 38.4K bps data throughput, and 1Mb RAM (expandable to 4Mb). Any mixture of serial and parallel ports can be configured with automatic conversion from one protocol to the other. Marketed as a low-cost alternative to networking, the Bytelink can be used for file transfers between mainframes, minis and PCs; it supports email and priority levels.

Tagged-Image File Format (TIFF). The complete range is available for PC-compatibles as well as Macintosh II and SE30 formats. OmniProof matches two wordprocessing files and identifies changes that have been made since the file was created. It features a Comparison Window giving side-by-side views of the documents, highlighting the changes and allowing for further changes to be made. A Composite Summary automatically generates a list of



Document Information Summary				
Page	Line	Change	Text	
1	10	Replace	"example" by "test sample"	
1	23	Delete	"later"	
2	14	Insert	"variety"	
2	32	Move	"you should pay..." from page 1 line 42	
3	4	Delete	"before"	
5	26	Insert	"from this"	

Check Spelling	
Suggested Words:	Unknown Word:
history historian hastily his story his fury his ferry	h15forq <input type="button" value="Add"/> <input type="button" value="OK"/> <input type="button" value="Replace"/> <input type="button" value="Cancel"/> <input type="button" value="Select Dictionary..."/>

OmniPage add-ons

Performance Sales

Ph: (02) 906 4900; Fax: (02) 906 4835

Price: Free upgrade for version 2.0 users

\$325 OmniProof

\$325 OmniTrace

\$250 OmniSpell

\$250 Omnidraft

Caere Corporation have announced a family of add-ons for its OmniPage page recognition software, and a version 2.1 of OmniPage which now can handle documents in

all changes made to both documents, noting the location of the change and providing a brief description of the change. OmniSpell (which requires version 2.1 of Omnipage) automatically checks and corrects the spelling of scanned text before transferring it to a wordprocessing program. It has been 'tuned' to recognise common scanning errors arising

from shape-related problems, such as distinguishing between '5' and 'S'. As well as a 100,000 word American dictionary, OmniSpell had a legal and medical dictionary and optional dictionaries for eleven European languages.

OmniTrace can be used to convert bit-mapped (raster) images into Encapsulated Post Script format by vectorising the

images. A comprehensive Toolkit is included for line and Bezier curve editing. OmniDraft allows OmniPage (2.1 is required) to recognise draft-mode 9-pin dot matrix text – printers from IBM, Apple, C. Itoh, NEC, Panasonic, Epson and others are supported. Text size can range from 8 to 72 points, be in single or multiple columns or in either portrait or landscape orientation.

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DTP by the book



THE DESKTOP publishing revolution has swept over many an office. It solves many problems, but now it's essential that either computer people learn publication design and typesetting, or designers get computer skills. Teaching computer skills to designers may be easier than teaching design skills to computer professionals, but in many organisations the computer literate have to learn desktop publishing (DTP). They tend to find it easy to learn to drive a DTP program, but how can they learn typesetting concepts and how to design publications?

Two exceptional books are the place to start. They are *Looking Good In Print* and *The Makeover Book*. Neither gets sidetracked into discussions of individual software packages, and how to drive them, but concentrate on design and publishing information that is vital and useful with any combination of computers and software.

Looking Good In Print is a stunningly good looking book. In the first half of its 226 pages, it covers the vital concepts of graphics design as applied to publications, visual tools available to designers, and basic layout concepts for a variety of publications from advertisements to newsletters and books. It moves on with discussions on typefaces and sizes, use of white space and emphasis. The first half then finishes with a discussion on use of illustrations and design pitfalls. Then comes a short section of design makeovers, where a number of publications are analysed and improved alternatives are shown. The book ends with a substantial section which gives suggestions and solutions for typical business oriented publications, from advertisements through to brochures and newsletters.

The Makeover Book covers the same territory as the short makeover section in *Looking Good In Print*. After a brief section on basic design concepts, it launches into the body of the book. A vast variety of publications are shown with a 'before' on the left page, and an 'after' view of the same publication on the right. The improvements are dramatic, and it is obvious just how skilled the designers are who contributed to the book. An excellent and very useful book.

Looking Good In Print costs \$49.95, while *The Makeover Book* costs \$39.95. Both are by Roger C. Parker, and published by Ventana Press. If you are trying to design a publication, and need a bit of guidance, a solution will be staring out at you from the pages of these books.

Mouse 400 series

Microsoft

Ph: (02) 452 0288

Price: \$295 with Paintbrush and Mouse Menus

\$395 with Windows/286 and Paintbrush

Microsoft have released a new Mouse series with increased resolution, more accurate cursor movement, an OS/2 driver (as well as a Dos driver) and integrated serial electronics. With a resolution of 400 dots per inch, the Mouse gives more cursor control and requires less desk space for movement. A pop-up control panel lets users select from three predefined levels of acceleration, or no acceleration at all; the acceleration profile can be precisely customised with an included program. The OS/2 driver is smaller than ones previously available, so it operates faster; it can also detect whether the hardware environment is serial, bus or PS/2 interface.



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WY-370 Color Terminal

Wyse Australasia

Ph: (02) 888 7455

Price: \$2170 including keyboard

Wyse's new 14-inch color terminal offers ASCII and ANSI emulations, including WY-350 and DEC VT320 modes, as well as Tektronix 4010/4014 graphics. Using an ASIC (Application Specific Integrated Circuit) and a 68000 microprocessor, the

terminal has 64 foreground and background colors. It can be connected to two host systems or two ports on the same system and has a windowing capability that allows the screen to be split horizontally or vertically. Display formats can range up to 52 rows and 161 columns. The WY-370 has a refresh rate up to 74Hz and the ability to overscan, giving a borderless image; it uses a 16 by 20 character cell giving a high resolution.



PC AX3

Epson

Ph: (02) 452 0666; Fax: (02) 975 1409

Price: Not supplied

Epson's latest addition to their range of personal computers is the PC AX3, a 16MHz 80386SX-based machine with 1Mb of RAM (expandable to 14Mb on a dedicated memory

board). It has a single 3.5-inch floppy drive as standard (a 5.25-inch drive is optional) and 40Mb and 100Mb drives are available. A PS/2 compatible mouse port is built-in and there are five free, full-length expansion slots. Other features are front panel keyboard connection, password security and a Fast Boot option which cuts down on the number of memory tests during power up.

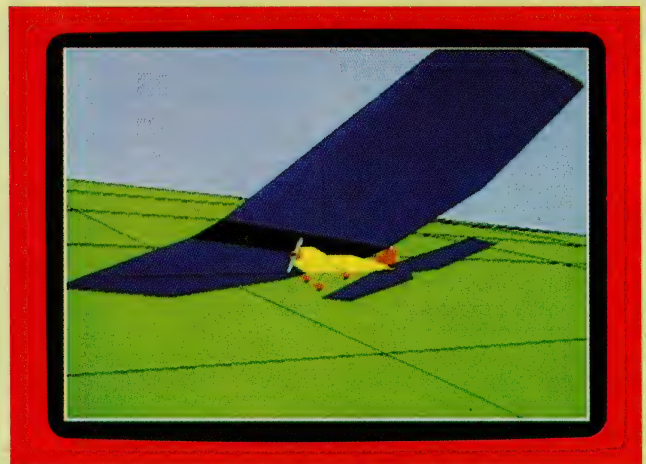
Flight Simulator v4.0

Microsoft

Ph: (02) 452 0288; Fax: (02) 452 4387

Price: See below

Flight Simulator version 4.0 incorporates a new feature which allows users to design and fly experimental aircraft and others enhanced 'realism' in flight simulation. Users can experiment with customised jets, prop-powered planes and gliders, testing them against the laws of flight. Other new features include a dynamic weather generator which simulates random weather patterns, a panning feature that allows the user to view the spot plane from any angle, and the ability to view surrounding airtraffic, including Boeing 767s and F14s. The new approach system and air traffic controls simulate landing at a real airport; air traffic control communications are displayed onscreen to give pilots clearance for take off and landing. Version 4.0 also provides ground activity with fuel trucks and sailboats. At press time, Microsoft had yet to announce a price for version 4.0, but it's expected to remain unchanged from version 3's \$95.

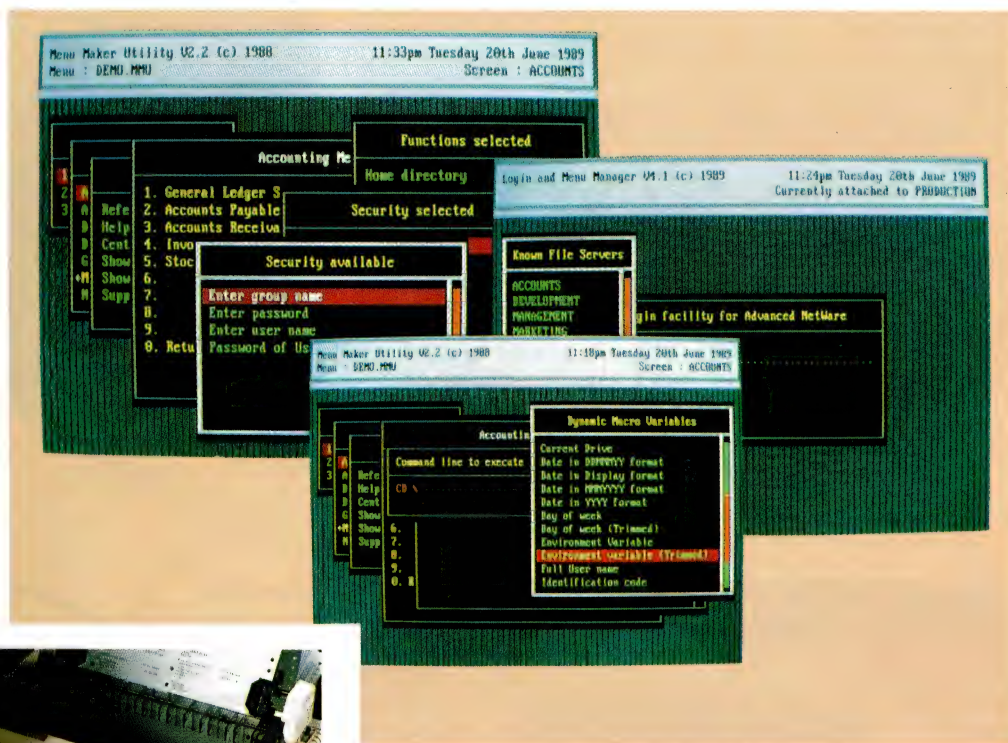


NEW PRODUCTS

Menu Manager v4.1

Amtec Software
Ph: (02) 959 5022
Price: Not supplied

Menu Manager is tailored specifically for Novell Netware and can be used to control log-in procedures, even for multiple file servers. It can be used to set up menus which insulate users from the operating system and to control access to files. Up to 255 different Menus can be generated and interlinked with the Menu Maker facility or from script files. Dynamic Macros can be used to identify users and groups, servers and other variables, allowing menus to be customised from global log-in scripts. While the program normally uses 90K of RAM, it can be 'outswapped' to occupy only 3K.



Portex Time Manager

Portex Information
Ph: (08) 234 3038; Fax: (08) 231 8755
Price: \$395

Portex, a time management package, features a diary, address database and wordprocessor and has the ability to 'link' a PC with a loose-leaf diary. The starter pack includes the software on both 5.25- and 3.5-inch disks and a set of compatible index cards and paper. The self-sorting address database has room for several thousand addresses and 14 lines of notes for each, plus a search facility. The diary covers years 1900 to 2099 and has a 'nag' facility to remind users of events and due dates. The wordprocessor has an 80,000 word dictionary and the ability to merge files with addresses from the database.

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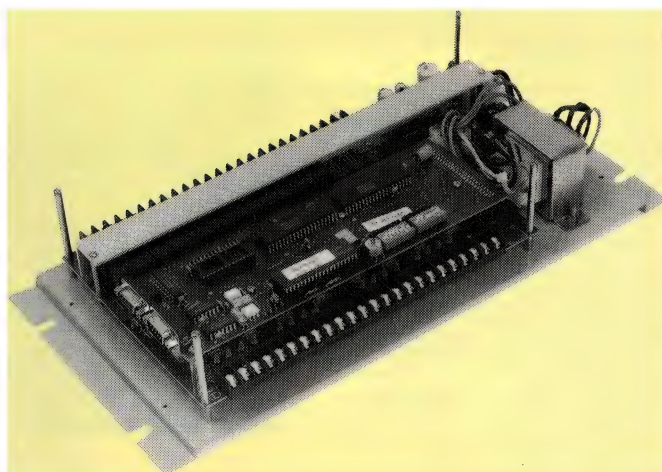
Computronics

Ph: (09) 221 2121; Fax: (09) 325 6686

008 998 003

Price: \$645

Perth-based Computronics have released the Kolinker 1616B I/O Controller suitable for a wide range of applications such as simple, standalone sequence control, and automating, manufacturing and testing procedures. The 1616B features 16 optically isolated inputs; 12 relay outputs capable of handling 10 amps; 4 open collector outputs for controlling stepper motors, solid state relays and similar devices; and built-in stepper motor control software. The unit can be configured to work in four different modes: as a computer I/O expander (the control program can be written in any language), as a remote slave controller (preprogrammed sequences are stored in the 1616B's EPROM, freeing the master computer from low level tasks), stepper motor controller with local intelligence, and standalone sequence controller (no computer is required). Using a standard RS-232 port, up to 31 devices with up to 372 relay outputs, 496 inputs and 31 stepper motors can be controlled. The Controller is fitted with its own power supply.



Scanlock genlock



MagnaTech

Ph: (02) 427 0666

Price: \$2117

The Vid-Tech Scanlock VSL-1 can be used to genlock the Amiga range of computers to a PAL or S-VHS reference video – the computer needs an external clock and H/V reset inputs. The Scanlock includes a video-process amplifier and the factory-set video parameters can be calibrated over a wide range. A vertical interval switch allows glitch-free switching between the reference video, computer video or keyed video (normal or reverse). A Fade control is standard and remote control is supported.

Atari PC4

Atari Computers

Ph: (02) 805 0344; Fax: (02) 887 2231

Price: from \$2795

Atari's new 16MHz 80286 machine is bundled with Microsoft Windows, Write, Paint, Card File, Calculator and GW-Basic and includes extended VGA drivers for AutoCad, GEM, Framework and other popular packages. VGA and 1Mb of RAM (expandable to 8Mb on the system board) are standard. I/O options include an internal 65Mb hard disk, a 44Mb removable cartridge and connection through the serial port to external floppy drives – a 3.5-inch floppy drive is standard.

Portapac

Keletronics

Ph: (09) 227 8952; Fax: (09) 328 1823

Price: \$198

Perth-based Keletronics has released the Portapac, a removable hard disk frame. It consists of an outer frame that fits a standard 5.25-inch hard drive slot and an inner frame that holds a half-height 3.5-inch hard drive (21 x 12 x 4cm). A key lock secures the frame when the drive is in place. A carry bag is included.

TurboCash Plus

Softcover Software

Ph: (02) 957 4010 ;Fax: (02) 929 7198

Price: \$349

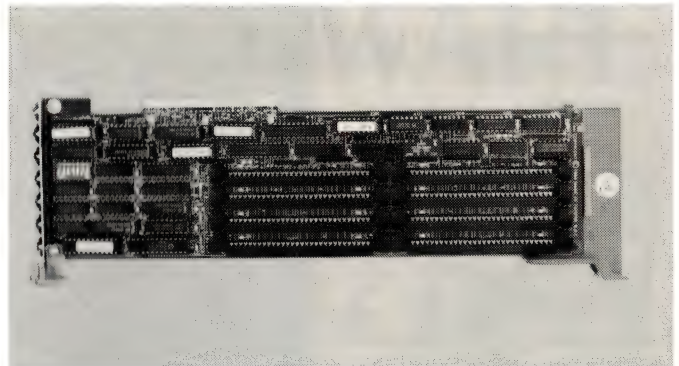
An enhanced version of TurboCash has been released by Softcover – it includes on-line stock records and invoicing. The package comprises general ledger, debtors, creditors, invoicing, statements, age analysis, stock, cash books, bank reconciliation, standard journals and budgets. A programmable report writer can be used to design up to 99 reports – all reports are formatted to fit A4 paper. Features include the ability to post to any period over the previous two years, batches with multiple periods and optional self-generating balancing entries. The package can run up to 99 companies with 5 sets of cash books per set of books and link notes to accounts. TurboCash Plus gives on-screen warnings for low stock levels or if a customer's credit rating has been exceeded. It allows automatic percentage adjustment of selling prices and supports both average and fixed methods of valuing stock. The on-line invoicing system can be set to automatically adjust stock levels. System requirements are Dos 3.0 or later, 512K RAM and a hard disk.



Formatted Disks

3M Australia
Ph: (02) 498 9333; Fax: (02) 498 4010
Price: Not supplied

3M is now supplying a range of pre-formatted floppy disks for PC-compatible computers. The company points out that the disks can save a user 20 minutes per box, which translates into a labor saving of about \$5. Based on 3M's Mark Q diskette material and manufacturing design, the disks have been tested for more than 30 million read/writes and actually outlasted the test drive. Both 5.25 and 3.5-inch disks are available.



PS/2 Memory Board

Electronic Solutions
Ph: (02) 906 6666; Fax: (02) 906 5222
Price: \$340 plus SIMMs

Electronic Solutions new Microchannel Architecture memory board provides automatic system configuration and is compatible with the programmable option select (POS) of MCA. The board supports printer spooling and virtual Dos applications with extended and EEMS expanded memory support. Purchasers have a choice between expanding memory with nine 256K SIMMs, giving an additional two megabytes, or nine 1Mb SIMMs, for an additional 8Mb.

DiskMinder

Portfolio Software
Ph: (02) 997 8954; Fax: (02) 251 3840
Price: \$139

DiskMinder is a powerful sector editor which allows the user to view and edit all the data on a disk or across a network. It features Mode Swapping to 'swap' between editing related pieces of the FAT, directory entry or sectors associated with the file, without any calculations at a single keystroke. Global search and replace are available as well as sector Put and Get functions. Diskminder supports partitions of up to 512Mb and will operate over a network. Other features include a pop-up calculator and ASCII chart.

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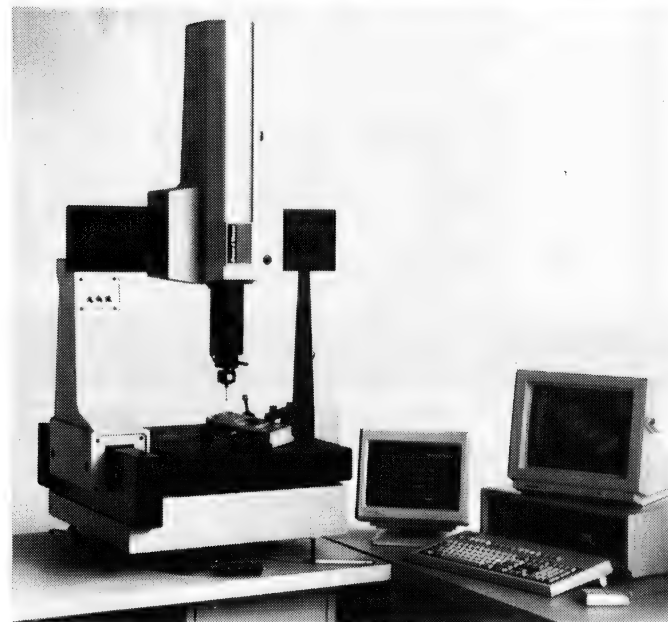
Chicony LT5400 Laptop

Teco Australia Pty Ltd

Ph: (02) 725 1233; Fax: (02) 604 9330

Price: \$8135

Chicony's latest release is a 16MHz 386SX-powered laptop with a removable keyboard, 40Mb hard disk and VGA display with a resolution of 640 by 480 pixels. Supplied with a carry case, the unit weighs about 7kg in the basic configuration. The 10-inch (diagonal) display tilts through 130 degrees and has controls for contrast, brightness and power on the front. Fluorescent green LEDs indicate Turbo, floppy drive and hard disk activity, power, Num Lock, Caps Lock and Scroll Lock. Two serial and a parallel port, an external keyboard connector and Multisync port, as well as an external 5.25-inch floppy drive connector are included. Standard RAM is 1Mb, expandable to 5Mb on the motherboard. The LT5400 has a single 16-bit expansion slot.



CopyCad

Amtech

Ph: (02) 683 4033; Fax: (02) 683 4981

Price: Not supplied

Jointly developed by CadKey and Brown and Sharp, CopyCad is designed to draw accurate blueprints from an object itself, and to compare a manufactured component with its design. A complete CopyCad workstation consists of CadKey 3.5, MicroVal (a coordinate measuring machine), CaddInspector (a software interface) and a personal computer. The system can also digitise a designer's free-form model to obtain drawing and manufacturing data.

WestLake products

Portfolio Software

Ph: (02) 997 8954; Fax: (02) 251 3840

Price: \$199 PathMinder

\$199 PC-Fullbak+

Portfolio Software of Sydney has been appointed distributor for the products of WestLake Data Corp of Texas, one of the largest suppliers of utility software in the United States. PathMinder Version 4.11 is a PC system manager which functions as a Dos shell. It incorporates a file and directory manager, displays the disk directory in standard format, tree structure or both. Users can move, copy, rename, erase or change the attributes of individual or groups of files. PathMinder has a built-in File-Finder which accepts wild card extensions. Executable files can be run with a single key. An automated custom menu generator is also incorporated. The built-in editor and print formatter creates, edits and prints ASCII files, while the print formatter supports column sizes of up to 132 characters and will print multiple pages with headers and footers on each page if required. The program will encrypt files, and can keep a system usage log by user and project. This new version also supports both expanded and extended memory and uses only 4K of memory while running an application. PC-Fullbak+ is a high-speed standalone backup utility which is independent of Dos versions. It comes as two programs, FB-EZ which allows the user to backup all files or only new files with a single keystroke, as well as compare and restore them, and Fullbak allows freedom in the selection of the files to be backed up, and incorporates optional time or data compression modes. It allows incremental backups and has error correction capabilities. Another feature is the Custom Script Generator for automating different backup procedures. PC-Fullbak+ also generates a log file to keep track of what files have been backed-up.

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Portable, or transportable

NOW THAT A couple of months have gone by and the initial hype and hooray that surrounded the launch of the first Mac Portable has faded, it is time to look seriously at the machine in the light of a bit of experience.

I haven't had much experience with it since Apple seem to have only one machine for all the technical journalists in Australia – there is a queue a mile long waiting to get access. But, I've managed to steal some unofficial time on the beast, and I've been picking the brains of other people who have had more experience. So, this isn't a review – more a summing up of the position at the present moment, together with my own ideas and a consolidation of 'enlightened' opinions.

I guess the biggest surprise, and the major disappointment, was with the 16 pound weight of the machine. Rumors had it that Apple were developing a laptop, and in the year running up to the release, IBM-type portable laptops were shrinking in size and weight at an alarming rate. A couple of them are now the size of large calculators that you can almost stick in a pocket.

Not so the Apple Portable; it was too big and heavy to sit on your lap unless you were built like a sumo wrestler, a complaint that Apple pre-empted by pointing out to the media that this was really a 'luggable'. It was portable in terms of 'fit-in-your-car-boot' portability, is essentially what they said.

Now that the realities of a 16 pound, suitcase-sized portable have sunk in with the press, retailers and potential purchasers, the machine has simply been relegated to a narrower slice of the niche market. It is now widely seen as a machine for small-business people, specialists like accountants who need spreadsheets that can be moved between the premises of various clients then brought back to the head office, engineers who need to take Mac graphics and project management programs out to the work site, and so on. It is not a portable within the usual meaning of 'portability'.

There is a range of service-professionals and consultant types who need both transportability and the Mac technology,

and who don't particularly care if the machine doesn't fit into their briefcase. Fortunately for Apple, this group of users can generally afford the rather ridiculous \$11,450 price that the company is charging for the machine, and fortunately also, the machine is good enough to be a 'first' machine which can comfortably be used in the office; it's not just a 'second' machine for occasional use.

This is, of course, both an advantage and a disadvantage. Many Mac users were looking for a cheap 'second' machine.

*The cursor does
'submerge' a little when
you move the trackball
fast, but not enough to be
annoying.*

Weight problem

PART OF THE weight problem comes from the choice of a lead-acid battery which Apple chose in preference to a usual nickel-cadmium (NiCad) because of its early-warning characteristics. When a lead-acid battery is nearing exhaustion, the voltage drops significantly well before the battery dies, and this drop can be read automatically to provide an indication of remaining battery life, and used to trigger alert boxes on the screen. The first alert warns you that you have roughly an hour of usage left. NiCad batteries hold their voltage right to the end, so you only get a warning when it is almost too late.

Apple say that their standard battery will power the machine for between six and 10 hours of normal work, depending on the amount of hard- or floppy-disk accessing you are doing. It is the disk accessing that eats up the power. If you configure a large RAM disk and move System and other files into it to reduce disk access even more, Apple say you can get 15 hours of use.

This is a substantial claim for any battery-powered machine, and most technicians where highly cynical about these times when Apple first quoted them. And, of course, they were right to be cynical – the times are inflated, but not by as much as everyone assumed.

There's no such thing as 'average' use, so there's no point in producing other battery-life figures to complement Apple's, but generally, experience has shown that you can bet on a consistent six solid working hours on each charge – and that should be enough for most people. In fact, this is probably the first portable made where you can get a full day's keyboard work from one internal battery.

The Porta-Mac achieves this extended usage period by using a low-power CMOS version of the original Motorola 68000 chip, but with a clock rate of 15.7MHz, which puts it about halfway between the Mac SE and the SE-30 in terms of processing speed. Apparently there wasn't a CMOS version of the 68030 available at the time the design was finalised, but look for this in the near future. The main memory (1Mb) is 100 nanosecond static RAM (SRAM) which is low in power requirement, but responsible for some of the extra costs, and you'll shortly be able to boost the machine to 9Mb if you've got a few thousand dollars to spare.

Apart from the disk access, the main power-saving comes from dynamic power management under the control of a special processing chip dedicated to the task. It switches off everything that is not immediately needed, or reduces it to a lower level of function. Leave the machine inactive for more than 15 seconds and the dynamic management system will drop into a rest mode at 1MHz; leave it for a couple of minutes and it'll go to sleep, but still retain RAM memory.

The sleep mode is terminated if: you hit any key; at a preset time; or if there is an incoming signal from a modem – and you can create a control-script (an auto-batch file) which will be executed whenever it awakens. This is an excellent idea that should be incorporated into all future Macs because it allows you to leave the machine in a semi-active state for over-

night communications – potentially for fax or ASCII modem exchanges, outgoing or incoming.

In a way, it is a pity that Apple haven't put more trust in this approach, and in the value of static RAM. I can't see any reason why they couldn't create a lower-cost, lower-weight version of the portable without disk drives at all. Tandy and NEC did this many years ago with their brief-case laptops built around the Kyocera/Microsoft core architecture.

These machines had a simple word-processor, list-manager and communications program in ROM, and relied on the non-volatile RAM to hold all data in memory until you returned to home-base and down-loaded it into a more substantial machine, or sent it home over the telephone line. These machines are still the standby of many journalists, and I've used my Tandy 100 (with only 24K of RAM) around the world on many occasions with totally fool-proof success. So, I doubt whether only 1Mb of RAM in a disk-less Mac portable would be a problem.

I may be wrong, but it seems to me that Apple wouldn't need to modify their present machine much; it would be a relatively simple matter to drop the disk-drives, controllers, and so on, halve the battery size and weight, and thus get a light-weight machine that would hold memory for a month or so with, say, 10 or so hours of use from a single battery charge. Applications could be down-loaded from a mains-powered Mac or from a plug-in disk drive at your home-base and then held indefinitely in the non-volatile RAM along with the data. Al-

Modularity seems to be the catch-phrase at Apple at the present time.

ternatively, simple wordprocessors like TeachText (19K) could be supplied on ROM.

Obviously the use of the active-matrix screen is more of a drain on the battery than the old conventional LCDs. Each pixel on the screen effectively has its own transistor, so there must be some increase in current drain, but I doubt whether the difference is enough to create problems.

Controversy

THIS WAS THE most controversial development among the new sub-systems in the portable, but my experience with the screen has been good. I grant you that it is almost impossible to work with the machine in low 'flat' lighting conditions – when you are my age you need to have a standard lamp to one side, lighting the screen just to get enough contrast. But generally, in a normal office or in a hotel bedroom, you've got enough light to work.

The cursor does 'submerge' a little when you move the trackball fast, but not enough to be annoying. And, at least you have the wide-screen 640 pixels on the portable which makes life much easier than the old 9-inch screen with only 512.

The wider viewing angle of the active-matrix screen is excellent, but better still is the provision of an adapter which converts the video-out port to feed a monochrome analog monitor, or NTSC, PAL or SECAM television sets. I haven't seen the adapter in use yet, but the idea is excellent, especially for people involved in sales, training or general education because it gives them ready access to moderately large screen sizes without having to lug a display monitor around the world. However, I would like to see the quality of the image on a PAL television set before I passed any judgment on this development.

I guess the only other feature that deserves comment is the use of the trackball rather than a mouse – although a mouse can be carried and plugged in at any time (even with the trackball in place). The trackball takes a bit of getting use to, and it still seems strange to me to have the 'click-bar' at the bottom of the ball unit rather than at the top, but you've got to expect some learning curve.

The modular approach to the keyboard, which lets you swap the trackball from one side to the other (for left-hand people) or swap it for a numerical pad, is an indication of the superb physical design and mechanical engineering skills that Apple are now putting into their products. Modularity seems to be the catch-phrase at Apple at the present time, and maybe we will see the idea extended even further in the future with card-type ROM packs for applications, and a choice of disk-drives or no-disk versions of a new 68030 'true' portable. □

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SIMPLE SECURITY

MOST USERS OF personal computers do not need elaborate data security measures to protect confidential data from secret organisations such as ASIO or the CIA, but rather to simply protect the data from the casual browser, or other users of their network. The best security is to prevent access to the PC itself, or failing that, using the keylock on AT style machines or using access control software/hardware combinations. This article does not deal with physical security issues, or hardware based solutions, but simple software security measures easily implemented on any PC.

The level of file and data security required depends on the results of a risk assessment exercise. The two main points to assess are the likelihood that the files or data will be seen by undesirable persons, and the effect of that disclosure.

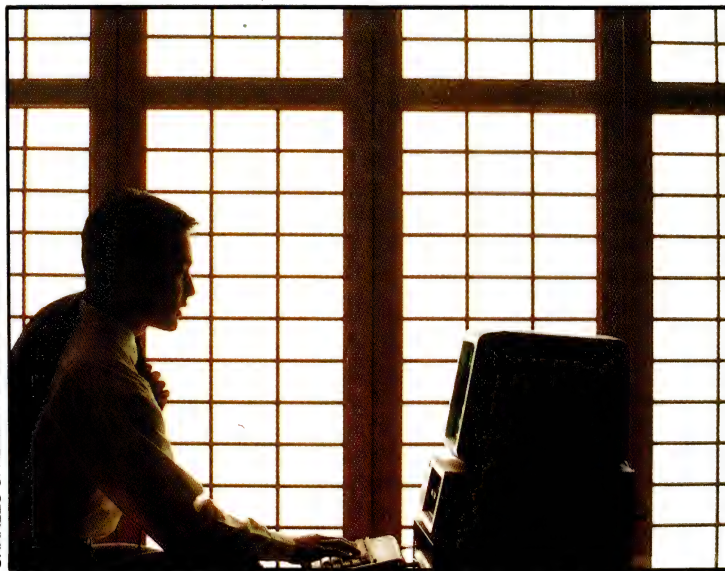
A large percentage of files and data handled routinely by business professionals and managers are at least confidential within the company in which they work. Such files may contain spreadsheets or letters relating to new product plans, pricing information, personnel reports, or future targets. The majority of this information will be stored on hard disks in clear English, awaiting anyone armed with a Dos boot disk and a copy of Norton Utilities or similar software.

For single users, the most secure method of maintaining data privacy is to use diskettes for data storage, and place them into locked storage when not in use. This is cheap, but can be hampered by a poor system of disk indexing or labeling, or by files extending over one diskette in length.

Removable disk packs, streaming tapes, or Bernoulli Boxes are simply a way of storing more data remote from the computer at greater cost, and less flexibility. The lack of flexibility is caused by the need for additional hardware to utilise the above storage media, which may not be available on all machines. Also, most programs will allow you to run the software

Small systems have simpler security requirements than big ones – Peter Bartlett discusses simple steps to PC security.

from a diskette or hard disk, and read and write data held on a separate data diskette. This would also be appropriate with removable disk packs and Bernoulli boxes,



CHARLES S. ALLEN/THE IMAGE BANK

but not always so with streaming tape.

If you work entirely on a hard disk, are sharing a personal computer, or are part of a network, the following suggestions may be of greater use than storing data on diskettes.

Naming conventions

THE DOS NAMING convention of an eight-character file name with a three-character extension are usually a straight giveaway to the contents of the file. No first prizes would be awarded for guessing what would be contained in the file RESUME.TXT, hidden in a word processor directory. A simple name change using the Dos RENAME command (REN), to RES00001.TXT for example, would distance the file name from the data it contains. This would make the data a less likely can-

didate for a surreptitious read by a fellow employee or even a supervisor.

The obvious disadvantage in using name changes for security purposes is the keeping track of all files and their contents. A file index again would need to be considered so that you could determine what is contained in the file SMUR0001.FIL in two years' time.

File attributes

FILES IN DOS have four associated attributes: Archive, Read Only, System, and Hidden. These attributes are read or set using software utilities, and the attri-

butes of interest for data security are System or Hidden. If the Hidden or System attributes are set on a file, the Dos Directory command (DIR) will not report that file's existence, and most programs will not be able to action the file.

Utilities such as the public domain ALTER.COM, or commercial software such as PC Tools, XTree, or Norton Utilities, can be used to alter a file's attributes. The only problem is to remember what files have been hidden, where they were hidden, and what their name was when you need to unhide them for use.

Neither of the above methods change the contents of the file, so they are

only a low level of protection from a browser armed with simple tools. The next methods of data security change the data contained in the file, so that even if the browser locates RESUME.TXT, they will be unable to read the story of your working life.

Compression techniques

MANY EXCELLENT public domain or Shareware data compression utilities exist, whose prime purpose is to compress programs for storage or transmission. Some examples of these are PKARC.EXE, PAK.EXE, ZOO.EXE, PKZIP.EXE, and lately LHARC.EXE. As well as providing space compression, and grouping files into one master file, these programs also provide a level of encryption security in that the data is modified, and cannot be easily

read without being uncompressed by the same method or program that was used for the compression.

Most of the compression programs identify the compressed files by the Dos name extension. For example .ARC, .PAK, .ZOO, .ZIP, and .LZH for the respective programs named above. The renaming of the compressed file, from RESUME.ZIP to RESUME.TXT for example, will prevent anyone reading the file until it has been uncompressed, and they will not be able to simply deduce how the method of compression from the file extension, or even that the file has been compressed.

The obvious disadvantage in using name changes for security purposes is the keeping track of all files and their contents.

The disadvantage here is that there are limited compression programs, so the simple method of trying them all will eventually produce the uncompressed data.

Data encryption

IF A FURTHER LEVEL of data security is required, even to the point of protecting sensitive data from foreign intelligence agencies, or from the Victorian Government (as in the case of the computer files confiscated from the BLF), data encryption programs are available. These programs are as simple to implement and run as the file compression utilities, and require that a Key be used to encrypt or decrypt the data. A Key is a user-defined string of characters that acts like a password, and is instrumental in the manipulation of the data being encrypted by the algorithm. This creates the need for Key management procedures, for if the Key is lost the data may be unrecoverable.

Some programs that promise encryption are not as secure as others. The least secure use simple letter/symbol substitution which is relatively easily broken using statistical analysis of letter repetition. More secure, but not much more so, are programs which use Exclusive OR (XOR)

techniques. These programs use the fact that if a binary string is XORed with a Key string, and then the resulting encrypted data is XORed with the same string, the original is restored. This is a fast method of encryption, with low overheads, and will suffice for most applications. It has been claimed that the original data can be recovered from the XOR encrypted file method in 15 minutes.

Greater security is offered by programs which use a DES algorithm, and it is here that we enter the murky world of spy and counterspy. DES stands for Data Encryption Standard, and is the method of encryption used for security and identification within the current Australian and International Electronic Funds Transfer (EFT) systems. Although the DES algorithm is publicly known, and indeed published in Australia as an Australian Standard for EFT Transmission (AS2805 Part 5), products created within the USA which contain DES are only permitted outside the USA with Federal government permission.

DES defines an iterative process whereby each 64-bit block of data is first shuffled to randomise input patterns, then certain fields are modified based on corresponding fields of the Key. This modification is applied 16 times, each time with different data and Key fields. Finally the data is shuffled again and then output.

There has been no demonstrated method of breaking DES except by trying each possible Key. This brute force method of breaking the algorithm would in the worst case require 2^{56} separate attempts. As current standards include methods for changing the Key with each transmission of data, or chaining encryption so that the result of one encryption process is part of the encryption of the next block of data to be processed, it is not possible to decrypt data encoded by DES using a current generation supercomputer.

Even so, some people have expressed doubts over the security of DES and are proposing a new algorithm. The RSA algorithm (named for its authors: Rivest, Shamir, and Aldeman) uses a process of factoring composite numbers using large prime numbers. This algorithm is not yet implemented as a standard, and has only recently been produced in a commercially available product. Both DES and RSA are relatively slow to work, with high overheads due to their complicated algorithms.

The DES encryption is available in a

Lock it softly...

DEPENDING ON THE level of security needed for your files, a file encryption program may be suitable. Local consultant Dr Victor Shestapol has written an easy to use program that is based on a proprietary algorithm, called Softlock. It can be run on any IBM PC, XT or AT, or a compatible computer under PC- or MS-Dos, version 3 or later. The software can protect any file: an ASCII text file, a document created by a word processor, a spreadsheet file, an executable file, whatever. Protected files are stored and transmitted in a scrambled form, thereby preventing unauthorised reading and editing. Softlock automatically decrypts the files for use and encrypts them again when they are stored. The program can be used on hard disks and floppies, file servers or over a network.

Once installed, Softlock is memory resident and uses only about 8K of RAM. Scrambled files – identified with an exclamation point in front of the file name, as in !MYFILE.TXT – can still be manipulated with Dos commands for copying, renaming, backing up and so on. Unless the file is unusually large, there is little time delay involved in scrambling/unscrambling. For example, a 64K file was scrambled on an 8MHz XT in under 20 seconds.

Each copy of Softlock has a serial number and unique internal code so that a file scrambled with one copy, can't be read with another. Password protection is available as an option. The program was written by Dr Victor Shestapol; for more information, contact Dinna Mathematical Modelling, 10/4 Lamont St, Wollstonecraft 2065 NSW; (02) 888 8832. Softlock is priced between \$100 and \$150.

number of products in Australia, even if it has been removed some software, such as PC Tools Deluxe; is also available on many bulletin boards around the country. A program named Secret Disk (from FMS, (03) 699 9899, \$350) contains DES as an option for encryption, as well as providing other PC security and access functions.

A public domain program, which is available on several BBSs in Australia, named PRIVATE.EXE provides DES encryption on files, as well as documentation on the DES standard, and DES test routines. It is menu driven, and easy to use. The user Key input must be recorded, because if the Key is lost not even ASIO can retrieve your data. □



ROY
HILL

Forth applications

IT NEVER CEASES to amaze me that Forth keeps popping up in the most unlikely places. The Powerhouse Museum has an educational exhibition train that travels around NSW, bringing a selection of the exhibits to the outback. Part of the exhibition is two robots, one of which places blocks in positions directed by the user, and the other acts as a baby sitter to a robotic doll. It has a motorised cradle, a pneumatic bell-jingler and a bottle-feed delivery rig. The 'baby' kicks and wriggles by means of six small pneumatic rams. Both applications run on IBM clones, but the 'baby' also has an Energy Control (26 Boron St, Sumner Park 4074 Qld; (07) 376 2955) RSC Forth board inside it.

Gary Luke, who designed the robots, also uses Forth for another fascinating application. To use Gary's own words ... 'The Master-touch Piano Roll company is one of only a handful of companies left in the world still making rolls and repairing player pianos. Currently, I'm working on a system for Mastertouch which allows the computer to read old rolls, receive real-time piano, or edit on-screen an original arrangement. The output can go to the piano with solenoids for testing, printed like a roll, and then run on their punch machine. Basically, it is using a computer to allow them to remain in the last century economically ... The whole thing is being developed in F88 (or F-PC). The roll-editor is an emulation of a Macintosh running in Forth on an IBM. (This is not a joke!) Pop-up menus, mouse, sliding windows, and dialog boxes – it is a genuine point-and-grunt user interface. For the people who will be using it, it is their first fearsome entrance into the world of computers. If it is awkward to use, then all the work would probably rightfully get thrown out the window.'

My sentiments exactly, Gary! It's just a pity that genuine Macs (real ones are the Mac II series) are so expensive, but their user interface is so friendly. In my day-to-day work, I use computers a fair bit, and I used to have an AT clone on my desk. Then, the Mac II arrived and I had it on my desk as well (I kept the clone so I could use it while I was learning the Mac). It only took two weeks for the AT clone to be asked to find another desk – the Mac does everything I want and more (of course, the LaserWriter IINTX has a lot to do with it too). It took two weeks for me to learn to use the Mac with the same confidence that I used the AT clone with, and that had taken me two years.

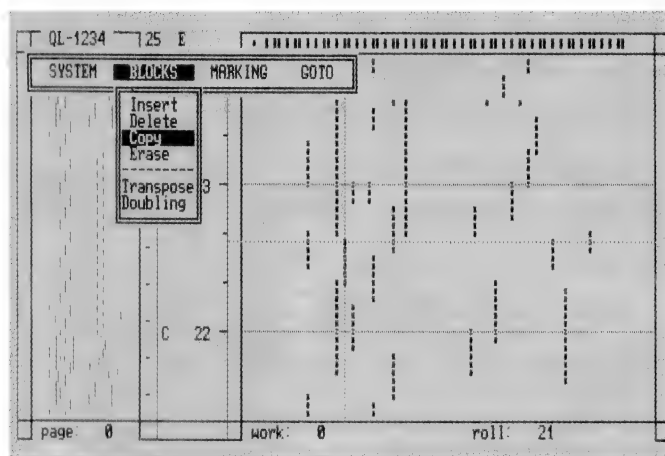
Gary has also offered two other very useful items.

```
Load Debug. Then load F83 from inside Debug.
A: >DEBUG
- nF83.COM
- 1
- g
```

– this puts you into F83 with everything running normally. Switch back to Debug to unassemble code words, to trace, to check the effect of words on other segments, and so on, by hitting Control C whilst in F83. Return to Forth by -g while in Debug.

This hint *will not work with F88* as Control C is used by F88 as its own cold start.

Gary has also done some coding of Mandelbrot and Julia sets using F-PC. I will attempt to get hold of Gary's source code in time for next month's column, and if the code is not too long, I'll include it as well.



Gary Luke's roll-editor is an emulation of a Macintosh running in Forth on an IBM.

Inside F-PC

THE LATEST VERSION of F-PC (v2.25) now uses Direct Threaded Code (DTC), rather than Indirect Threaded Code (ITC), as was used in previous versions of F-PC and F83. What is the difference between the two? In ITC, the Code Field is usually two bytes long (depending on the 'size' of the processor) and contains a pointer to executable code, which is the inner interpreter for the type of word being executed.

DTC on the other hand, uses a variable length Code Field which contains the actual code to be executed. The first byte of this field is called the Code Field Address (CFA) of the word. All words in F-PC v2.25 are referenced by their CFAs.

There are advantages and disadvantages to each type of addressing. DTC is much faster than ITC (because it eliminates one level of indirect jumping), but it takes up more space in the dictionary segment.

Figure 2 shows the manner in which a typical colon definition (in this case the definition for HEX) is implemented. The first location (2 bytes) in the definition is used to store the address of the View Field. This field is used to address the source code for the word, which is used when the user types –

VIEW HEX

– the VFA (View Field address) is used to locate the word in one of the *.seq source files (in this case, Kernel2.seq).

The next two bytes are the Link Field, which contains an address pointing to the Link Field of the previous word in the vocabulary thread. The Link Fields connect words with the same hash code into threads so that they can be searched quickly to locate a word by its name. In F-PC, the head dictionary is divided into several vocabularies. Words in a vocabulary are hashed into 64 threads by the first two characters and the lengths of their names. The last Link Field in a thread is stored in a thread table in the parameter field of its vocabulary definition. The first Link Field in a thread is set to 0 to terminate vocabulary searching.

After the Link Field is a variable length Name Field. The first and last byte in the Name Field are flagged by setting the most significant bits in them. The first byte is called the Length Byte because it has the character length of the word name stored in the lower 5 bit field. Thus, F-PC allows a word to have a name with up to 31 characters. Bit 6 in the Length Byte is the Immediate Bit. During compilation of a colon definition, words are normally compiled into a list. When the Immediate Bit is set, the word is not compiled into the list, but instead, is executed immediately.

Bit 5 in the Length Byte is the Smudge Bit. When the Smudge Bit is set, the Forth text interpreter will not be able to find this

one would have to search all heads in the Head Segment (which would be very time consuming).

To reduce the amount of searching, we divide the Code Segment into 64 x 1K regions. Each region has four bytes in the Code Search table. These four bytes define the area of heads to be searched for a code.

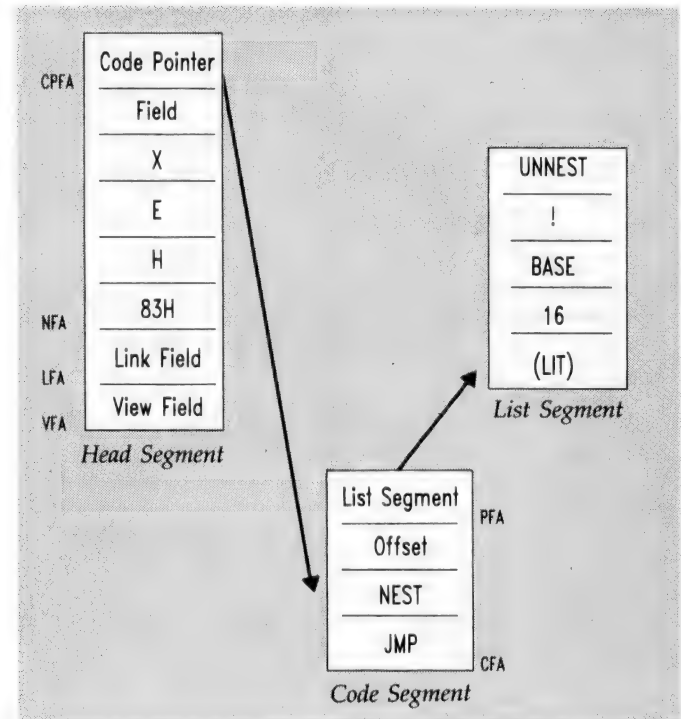


Figure 2. The manner in which F-PC v2.25 implements a colon definition – in this case, for `HEX`.

It took two weeks for me learn to use the Mac.

word. This bit is used primarily to prevent finding words which are not compiled successfully. When a head is created, this Smudge Bit is always set to 1. After the colon word is compiled successfully, this bit is turned off so that the new word is revealed to the text interpreter. However, if compilation is unsuccessful, the word remains 'smudged' and the interpreter and compiler will not be able to find it. Thus, the user is protected from compiling or executing invalid words.

Most Forth systems use the smudge bit to prevent invalid words from being executed or compiled. However, the invalid words still occupy dictionary space. F-PC does not use the smudge bit to protect the system. Instead, it only links words successfully compiled into the dictionary. Thus, when a word is not compiled successfully, it does not take up memory space.

The name of a word is compiled in the Name Field. Up to 31 characters can be included. The last character is indicated by a 1 in bit 7, to delimit the Name Field.

The last field in a head is the Code Pointer Field, which contains the execution or code field address of this word. The address points to the code field of this word in the Code Segment. This address will be used to execute this word by the interpreter, or compiled into a list by the colon compiler.

The first 256 bytes in the Head Segment are a Code Search Table. This table reduces the time to search the Code Pointer Fields in the heads by the decompiler. The vocabulary/thread structure is designed to locate the code field of a word from its name. The decompiler needs to do the search in reverse, finding the name of a word from its code field address. Because F-PC moves the heads out of the code dictionary and puts them in the Head Segment, the natural link between a code field and its Name Field is broken. To find the Name Field from a code field address,

Sundial mask

A NEW MEMBER of the Forth Club, Jim Goulter, has sent in the following example of F-PC being used to produce the 'mask' for a sundial. I have taken the liberty of looking up the latitude (in degrees and minutes) for Sydney and including that as part of the file.

```
comment:
Calculates the angles to the time lines for any latitude use:
(degrees minutes --) which shows Latitude as degrees,
minutes. It produces a table of angles for the time lines, as
measured from the 12 o'clock line for an accurate sundial for
that latitude. AM lines are measured to the right of the 12
o'clock line, and PM lines to the left (the opposite is used in
the northern hemisphere). The gnomon (shadow caster) is a
triangle made with one angle equal to the latitude. It is
attached along the 12 o'clock line with the point of the
triangle just touching the 6 o'clock line. The 12 o'clock line
is pointed due south (once again, the opposite is used in the
northern hemisphere). For fun, try 0 1 Sundial (that is, 1
minute south of the equator) and 90 0 Sundial (the poles).
(cf63)Note (cf94)that the 6 o'clock line is always at 90
```



```

degrees to the 12 o'clock line.
comment;

fload sfloat
variable hrs      fvariable latitude      fvariable period
: Reset-time ( -- ) 0.0 period F! 1225 hrs ! ;
: >latitude ( n n -- )
  \ Convert (deg mins - ) to deg decimal. Store in
latitude
  swap s>d float s>d float 60.0 f/ f+ latitude f! ;
: Segment ( F: -- r ) \ Retrieve next period & increment period
by 1/4 hr.
  period f@ fdup 0.25 f+ period f! ;
: Angle ( F: r -- r ) \ Calculate the angle to timeline.
  segment 0.2618 F* fdup fsin latitude f@ 0.0175 f* fsin F*
  fswap fcos f/ fatan 57.2958 f* ;
: Adjust? ( F: r -- r ) \ Adjust if necessary to keep angle
positive.
  fdup floor 0( if 180.0 f+ then ;
: Print-time ( n -- ) \ Convert decimal time of day to hrs,mins
then print.
  100 /mod 100 * swap 6 * 10 / + s>d (### 58 hold ###)
type ;
: AM-hrs ( -- ) \ Calculate & print AM time after decrementing by
1/4 hr.
  hrs @ 25 - dup hrs ! print-time ;
: PM-hrs ( -- ) \ Calculate & print PM time.
  2400 hrs @ - dup 1300 >= if 1200 - then print-time ;
: Print-angles ( -- ) \ Calculate & print the table.
  33 0
  do am-hrs . " ----- " pm-hrs . " ----- " angle adjust? 1 5
F.R cr
  loop ;
: print-heading ( -- ) cr cr ." AM PM ANGLE
" cr cr ;
: SUNDIAL ( n n -- ) reset-time >latitude print-heading
print-angles cr ;
SUNDIAL

```

This program is once again an example of the wide variety of uses to which Forth is put. I hesitate to say that Forth programmers demonstrate the greatest versatility of all programming languages (in case I get shot down in flames), but it appears as though it could easily be the case.

Case statement

NOW, I WOULD like to look at the Case statement in Forth and show where it has particular uses. The Case statement was the subject of a competition run by FIG, back in the early '80s, with one particular version by Charles Eaker winning the award for the best construct. The Case statement is used to select from a multiplicity of choices and is similar (in application only) to the old On ... Goto of Basic.

A very good example of the use of the Case statement is in one of the F-PC source files (in this case a program that allows the PC to act as a floating point scientific calculator). The source files are Abacus1.seq and Abacus2.seq, but the actual source for the Case statement is found in Abacus2.seq. The Case statement is used in

this context to select which direction to drive the cursor on the screen, given a code on the stack that represents normal keypad cursor controls (for example, 203 for a cursor left key).

The code that does all the selecting of cursor direction is -

```

: do-cursor ( n -- )
  ibm-at? rot \ save cursor
CASE
  210 OF select ENDOF
  187 OF abort' back' ENDOF
  199 OF first-key ENDOF
  200 OF cursor-up ENDOF
  203 OF cursor-left ENDOF
  205 OF cursor-right ENDOF
  207 OF last-key ENDOF
  208 OF cursor-down ENDOF
  243 OF first-column ENDOF
  244 OF last-column ENDOF
  245 OF last-key ENDOF
  247 OF first-key ENDOF
DROP
ENDCASE
show-keys
at \ restore cursor
;

```

As can be seen from the code, the direction that the cursor moves is selected from a value placed on the stack. Prior to this, the current cursor location is stored using the word 'ibm-at', and then retrieved at the end using the word 'at'.

A DEFERred word

I HAVE BEEN experimenting with the brilliant F-PC package and have just become familiar with the concept of a DEFERred word. What a great idea! Many times in Forth I have thought 'gee, that's a great word, if only they'd added ... 'Well, with the use of just two words, Defer and Defers, one can ...

I will illustrate this with the use of a trivial (but transparently understandable) example. Suppose I wished to compile a new word called Test, and I wished it to include several previously defined words. This is how it might look -

```

: TASK ; \ I make lots of mistakes when I'm thinking in Forth, so
\ this makes it easy to forget - isn't there a song \
like that?
: T1 ." HELLO " CR ;
: T2 ." GOOD-BYE " CR ;
: T3 CR 10 0 DO T1 LOOP ;
: T4 CR 10 0 DO T2 LOOP ;
: TEST T3 T4 ;
TEST

```

- fairly trivial! However, suppose that I don't know in advance what words I would like to include in Test. That makes the problem a little more difficult.

Now, let's make it easy on ourselves to change something *after*

THE FORTH COLUMN

we have defined it. Let's have another look at how we could define Test –

```
: TASK2 ; \ just as easy to forget
DEFER TEST \ make a dictionary entry for TEST (similar to
CREATE)
' NOOP IS TEST \ and make it equivalent to NOOP

COMMENT:
    At this stage, you might like to try out the definition
    all that Is does is to equate Test to Noop. You don't even have
    to do this (uf1970) you could leave the definition of Test blank.
    Just don't try to execute it as a blank word - you'll get
    an error message that reads '(- is an
    uninitialised execution vector'.

COMMENT;
: T1 CR ." HELLO " CR ;
: T2 CR ." GOOD-BYE " CR ;
: T3
    DEFERS TEST
    10 0 DO T1 LOOP ;
' T3 IS TEST
: T4
    DEFERS TEST
    10 0 DO T2 LOOP ;
' T4 IS TEST
TEST
```

– the words Defers Test in each of the above definitions tells F-PC that I wish to add the contents of this (the current) definition to the previously defined word Test. Immediately after each definition (that is, T3 and T4) is compiled, I retrieve the address of each definition and place it on the stack (using `'` – pronounced Tick) and add it to the (Noop) prior definition of Test. Now, I can add anything I want into test, without recompiling the whole of the system. `'Is` is then used to add the contents of this word to the word immediately following (Test in the above example).

A similar sort of word to Defer ... Defers is Alias. Alias is used to 'link' words that a user might type in thinking they were standard. For example, people who still like to use Vlist as opposed to Words could do –

```
' WORDS ALIAS VLIST
```

– and then use Vlist as they used to. However, the Alias isn't saved unless one performs a Save-system. For those who would like to know more about using Aliases (that is, using similar thought pattern names to represent others), I will illustrate using an example from the documentation accompanying F-PC Version 2.25: '... the last time we counted, F-PC contained 1800 regular words (obviously DEFERred to All-bran RH) and 700 headless words – it contains everything except the kitchen sink. Well, such an omission is not to be tolerated. So, let us throw in the kitchen sink as well, to make it complete –

```
: SINK ." A conduit to BBB, the GREAT Big Bit Bucket." ;
: KITCHEN ." See SINK" ;
' KITCHEN ALIAS KITCHEN-SINK
```

– type the above program in, exactly as written, and then type KITCHEN-SINK to see the effect.

Real beginners' section

OK, I DIDN'T get around to it for the last few months, but I've had a fair amount to cover, and editorial space is getting tighter. I'm going to assume that you're brand new to Forth and that you have access to a Forth package. The first thing you'll notice (*especially* if it's Public Domain) is that the documentation is *far superior* to those packages that you've forked out \$1000 for. Strange, that! (Not that I'm a cynic!).

```
: CYNIC ."Roy Hill is one of these!!!" ;
```

Type in the above (after booting your Forth system) *exactly* as I have typed it (with the Enter key) at the end of the line after the semi-colon. Then type CYNIC, and press the Enter key and watch what happens. You've just written your first Forth word. The `'` symbol (pronounced Dot-quote) is used to print out (to the screen) *literally* everything up to (but not including) the next `'` (Quote) symbol.

Now, modify the above word (for homework, of course) to prove that I'm just as gullible as the rest of the public. I want a New Word that prints – 'Roy Hill thinks that ALL software documentation is EXCELLENT'.

Here's a hint – the colon symbol (`:`) starts a new Forth word definition and the semi-colon symbol (`;`) terminates it. Spaces are significant, as they are used by Forth to tell where one word finishes and another starts. In particular, don't forget the spaces after the colon (`:`) and the Dot-quote (`'`) and the space before the semi-colon (`;`). You should also use a new Forth word for the definition (for example, GULLIBLE), as CYNIC has already been used and you would receive a warning message that says 'CYNIC isn't unique!', or 'CYNIC already exists'. These are only warning messages, indicating that the word you are defining is already in the Forth Dictionary. However, only the most recent definition will be used.

Energy Control

ONE OF THE long time supporters of Forth in the business community is Energy Control (mentioned at beginning of text). Ken Curry (the MD) has been keen to promote the use of Forth in Australia. He even volunteered to underwrite part of the cost of the Forth Conference. Energy Control have released a single board control computer, based on the W65C124 chip, manufactured by Western Design.

To quote from the introduction ... 'There are 8 opto-coupled-isolated digital input lines, 7 digital output lines (5 are opto-coupled-isolated), 11 ADC (two buffered) lines and two unipolar/bipolar DAC output lines. The controller can be connected to the host computer using a 9-pin RS232 port, and the devices to be controlled by means of either a 64-pin Euro connector, a 20-pin IDC connector, or a 5-pin IDC. The board costs \$560 and uses Forth to converse between the host and the controller board.' The documentation that accompanies the board (2 manuals) contains all of the information required for even a simpleton (like myself) to use the controller productively. Recommended! □



JOHN
HEPWORTH

AskSam!

WHEN A KID needs something they can't find, they ask mum. When you can't find information in a mass of text, turn to AskSam. Not a person, but a very interesting approach to data management, it is an amazingly powerful free-form database. It is programmable, offers a hypertext facility, and can integrate graphics into a database. It can have explicit field names, just raw text, or a combination of both, and records are effectively of unlimited length. It is said that the transcripts of the Colonel North trial in the US were recorded in an AskSam database, allowing searches and cross-referencing of data that were far quicker and simpler than would have been practical with any other method.

In August 1988, AskSam was reviewed extensively in YC and elsewhere. I won't repeat that here, but I find it so useful that I would like to share with you a couple of the ways that I use this excellent free-form database. Maybe they'll set your ideas going.

I use AskSam in two very different ways with the same overall purpose. As a writer, it is essential for me to be able to find reference material very quickly. In the fast-moving area of computers that means seeing a vast range of journals, books, magazines and pamphlets. While I try to file them in a consistent manner, it isn't possible for me to remember exactly where in that ton of paper a particular vital fragment might be. My other problem is also involved with gaining information. Like many readers, I make a lot of use of bulletin boards, and download a lot of messages from the international and local echomail conferences. I could read them all, but usually I am looking for information on a particular subject. I must narrow down the search as quickly as possible.

So, I could find articles in publications, as several years ago I set up a conventional database with the names of publications and articles, with keywords, and brief remarks about each entry. The rigid structure was a pest. It was laid out to suit the information and indexing of articles and publications at one time, and as the years went by the types of articles being indexed changed subtly, and sometimes

radically. Trying to fit a meaningful description of an article into a rigid-length remarks field was an awful task. It became more and more difficult, and the database less and less useful.

Then, AskSam rescued me. I took the old database, exported it as an ASCII file, and read it into AskSam, with each old record becoming a record in the new AskSam database. I then set up a template for new records, with a number of explicit fields, but with 75 per cent of the screen free for free-form remarks. I can now consistently record details of a publication in the explicit fields, while simultaneously allowing free entry of a full description of an article in it. No longer is it necessary to rack my brain trying to decide which keywords would always be meaningful, as AskSam can look for any word in the record, and can search for multiple words in all sorts of logical combinations. It can look for one word *and* another word, one word *or* another, or one word *near* another. The results of a query can be sorted, arithmetics performed, and all sorts of other vital tasks carried out. These are the most simplistic examples of the available searches, just remember that the reference manual lists 97 different commands and operators that can be used in a manual query.

*AskSam is powerful, and
at the same time a bit
demanding of its users.*

Even more important, is that quite extensive programs can be written using all these commands, and stored within the database ready for automatic execution at the user's whim.

My other application

LET'S LOOK AT my other application. It takes a little massaging of the capture file from a bulletin board before it is ready for import into AskSam. Typically, what I have

on file is a capture from a whole session on the bulletin board, complete with opening screens, menus and sign-off screens. I need to strip off all of the rubbish, leaving just the messages. Then I need to insert a two-character delimiter at the start of each message so that AskSam knows where to start each new record. It doesn't really matter what two character string is used, as the user tells AskSam what to look for during the import. All that matters is that the string used as a delimiter isn't already in the text file.

In December 1987's column, was my little program called Clrecho, which stripped off all those menus and screens, and created a file of the messages alone. With a small modification, this now inserts my delimiter string before each message. Now, I can search for information in the messages, and be confident of finding the necessary information quickly and efficiently.

AskSam is powerful, and at the same time a bit demanding of its users. Having a free structure demands that the user control the data input, as automatic data validation is a concept diametrically opposite to free-form data. Queries are powerful, but must be logically expressed in AskSam commands that can be a bit arcane at times. For all this, it can be used at a basic level with minimal training, and at this level delivers substantial dividends.

It's a vital program for anyone who uses a lot of information in free-form text, from writers, to lawyers and professionals in every sphere.

AskSam version 4.2 is manufactured by AskSam Systems in Florida, and distributed by Software Suppliers Pty Ltd, 7 Avon Rd, North Ryde 2113 NSW; (02) 888 1955. The single user version costs \$520 rrp, and the networking version for 10 users costs \$1395 rrp.

Simple Win

MICROSOFT WINDOWS is very much in its ascendancy. Over the last few months, there has been a flood of serious software to run under Windows. So far, however, there has been one problem. When Windows is started, the user is faced with a simple screen with a list of file names.

Usually, this is a list of all files in the default Windows directory, whether executable or not.

What is needed is a simple menu system that exploits the Windows graphics environment. Usually this means a program to run over Windows, that has a multi-level menu structure, and which can be adapted to the file structure and applications on your PC. While there are a number of such products, commercial and shareware, one of the nicest is Simple Win. This not only creates a menu structure but it does it in style, making excellent use of icons to illustrate the menus.

When it is run, the main Simple Win program displays the main folder — its name for each menu screen. The main folder is a window with 12 icons, each with an image and brief verbal description. Each icon could either call a lower level folder or run a program. A default main folder comes with the program, and in this, all 12 icons are used to call various lower level folders. Some of the standard second level folders are empty, while some are nearly full of icons already defined.

Changing from the main folder to a

*Simple Win is powerful,
while at the same time
easy and instinctive to
use.*

lower level folder is a matter of simply clicking twice on the desired icon, and the lower folder pops up over the main folder. Likewise, running a program is a matter of clicking twice on its icon.

What if you want to change the default menu structure, so that it reflects the software on your system and your working methods? Earlier, I mentioned a main Simple Win program. Well, there are really two main programs. One is called Menu.exe, and simply runs menus that have already been defined. The other is Editmenu.exe. It has all the same functions of Menu.exe but in addition it can create menus, and edit those that already exist. Normally in a large organisation, the support staff would have Editmenu so that they can create menus, and the end users

have Menu so that they can use the system without risk of someone making unexpected changes to it.

An important utility program comes with Simple Win. This is called File Manager. When it is run, it displays a visual tree of the default drive, complete with a little icon at the bottom for each available drive. Changing drives is achieved by clicking twice on a drive icon, and changing directories by clicking on a directory entry on the tree. Next to the drive icons is a garbage can icon. Files are copied from one directory and/or drive to another by selecting one or more at a time, and simply dragging them to the new location. They are deleted by dragging them to the garbage can. Once in the garbage can, they are on hold till the user decides to permanently get rid of them. In the interim there are in a hidden directory on the C drive.

Simple Win is powerful, while at the same time easy and instinctive to use. It has become a fixture on my system. Manufactured by Matesys, and distributed by Wholesale Technology, 195 Elizabeth St, Sydney 2000 NSW; (02) 286 0217, Simple Win costs \$139 rrp. □

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PETER
PHILLIPS

Small goodies

THIS MONTH I'VE taken time off from looking at big software packages. Instead, it's the turn of those routines that can operate with a few K of memory. But, not all small software routines are good, some are downright diabolical, in particular the dreaded viral routines. On a different theme, news of a most important update: Appleworks GS is now up to its third version, although I'll have more to say on this in coming months. But first, the dreaded lurgy ...

It seems the IIGS has attracted the attention of the virus writers. Does this mean the IIGS has reached the big league? Or does it mean nothing is sacred? After all, the IIGS installed base is primarily schools and private homes, and a IIGS virus affects the community at its most vulnerable level, often leaving kids and computer illiterate mums and dads gasping in disbelief as programs crash and disks are wiped. What a world we live in!

I am aware of three viral type programs, the latest being one reportedly from France. The IIGS, like the Mac, is complex enough to make viruses rather difficult to detect, and the French virus is one that, after a random number of disk changes, starts wiping disks. According to my source, the code occupies the first four blocks of track zero of the disk carrying the virus, and copies itself onto each disk you use after the diseased disk has been read. Fortunately, if you turn off the power the virus is killed (for the time being), but make sure you power off for at least 20 seconds to allow data in RAM to die. However, the affected disk needs to be purged, and most user groups have anti-virus software to treat the problem.

There is no perfect defence against a virus, as a data disk containing text, graphics, digitised sounds, public domain software and so on, are all potential carriers. The GS Users Association (PO Box 210, Wentworthville 2145 NSW; (02) 688 2701) is one group I know of that stocks anti-viral software.

Appleworks GS update

CLARIS HAS RELEASED an update of Appleworks GS that features major speed en-

hancements and compatibility with System 5.0.2. The new version is 1.1 and registered users can obtain an update for \$30. Try your Apple dealer, or contact Dataflow (134 Barcom Ave, Rushcutters Bay 2011 NSW; (02) 331 6153) to obtain an update. Although I have not yet seen an updated version, I'm told that load times are increased up to eight times (using the Express load facility of System 5) and that most screen updates are now faster. This allows users to scroll through documents quicker, and apparently spreadsheet recalculation times are also faster. As well, files created with Appleworks v3.0 can now be imported. I'll have more to say when I've seen a copy, as there are other enhancements that appear to make this update well worth the \$30.

A IIGS virus affects the community at its most vulnerable level, often leaving kids and computer illiterate mums and dads gasping in disbelief.

Customising your IIGS

LIKE PERSONALISED number plates, a customised computer is a sign of individuality. The first thing I did when I purchased my IIGS was to set the screen colors to black text, white background, light grey border. Boring you say! No, I'm being an individual, choosing monochrome text knowing that simply everyone uses color. But customising can go much further and System 5.0.2, though requiring more disk space than any other system so far, allows lots of ways to personalise its appearance and operation. For example, you can use an alternative to the Finder, or you can add desk accessories, INIT files,

modify icons, add fonts and utility programs.

Ideally, a hard disk is the only real way to go, as adding files to a 3 1/2 inch system disk is virtually impossible unless unwanted files are deleted first. Alternatives to the Finder are available, such as ProSEL, (more suited to ProDos 8), Ezidrive and other shareware programs such as Jumpstart and the text based Squirt-16. My experiences with other finder/launcher programs have not been happy enough to make me change, and the improved speed of System 5 makes a graphic based launcher nearly as fast as their text based equivalents anyway.

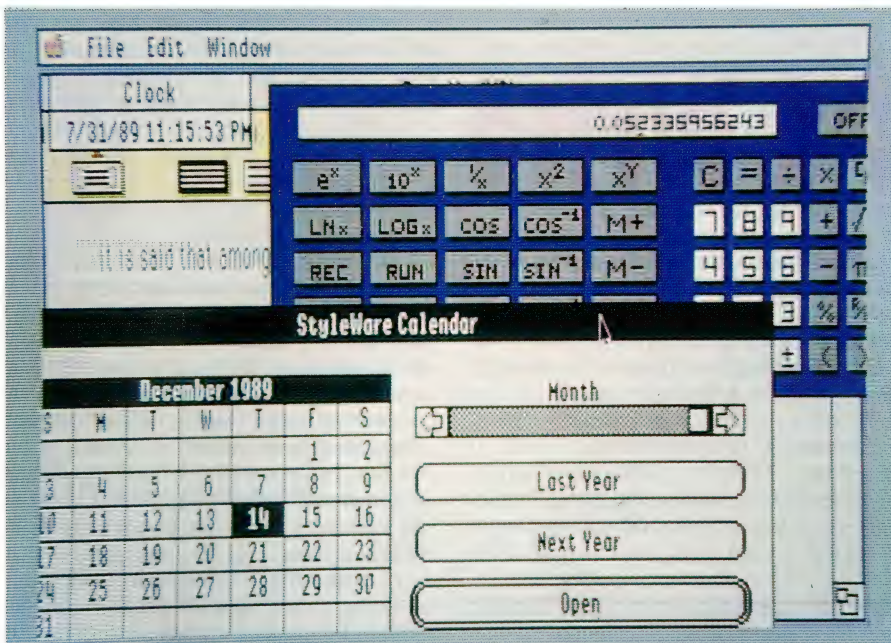
Modifying icons is a popular way to customise, and a range of icon editors are available. I use one written by David Lyons which came on a shareware disk. This disk has lots of other great utilities of interest to programmers under the general title of Nifty List. The icon editor is called Diced, and the disk is available from DAL Systems, PO Box 875, Cupertino CA 95015-0875 USA.

Adding fonts is now almost the norm, and a large variety of fonts is available either from applications software, from user groups or public domain sources. Fonts can also be created with font editors, but I have reached a point where any more fonts will send me up the wall. I can't remember the shapes of those I have, let alone adding more. But, if I was into desktop publishing, I would be collecting any that came my way.

But by far the most useful customising method is the addition of desk accessories. These can turn your computer into almost anything, such as an alarm clock, a note pad, diary, calculator, you name it.

Desk accessories

A DESK ACCESSORY is a utility that can usually be run from any program. Desk accessories for the IIGS can be either classic desk accessories (CDA) or new desk accessories (NDA). All IIGS computers have at least two CDAs: the control panel and the alternate display mode, accessed using the Apple, Control and Escape keys. There are now many CDA packages available,



NDAs are becoming all the rage – on screen is a clock, full function calculator and calendar, which have all been superimposed over an Appleworks GS wordprocessor file.

such as Power (by Microsystems, in Orlando, USA), and these are often used by software developers. CDAs are normally accessible from all programs, not just those running from the usual window environment. This means they can be used from programs such as Appleworks and other traditional ProDos 8 software. But more pertinent to everyday users are the range of NDAs available.

NDAs are usually accessed by clicking on the Apple icon to the left of the menu bar, and are therefore only available from software that uses this type of environment. When the Apple icon is selected, a listing of the available NDAs will appear, and clicking (or selecting) the desired utility will cause it to appear in its own window over the application currently being used. And, NDAs can be incredibly useful, particularly if you spend a lot of time in front of your computer. I have two NDA packages installed, and although some duplication exists between them, the end result is a around 25 useful utilities.

One NDA that most IIGS owners will now have is the graphics based control panel, released with System 5.0. All NDAs should be located in the subdirectory called Desk.Accts, itself in the System subdirectory. An NDA is a program in itself, but one that can be entered from within another program. Thus, an NDA always re-

turns to the original application without loosing data on the way.

One NDA package that I have had for a while is Desk Top Extras, written by Styleware, but now owned by Claris. It is readily identifiable in that it causes the Apple icon to scroll through various colors, indicating that the NDAs are available. The other set of NDAs comes from SSSI

A most useful NDA is Screen Saver.

(4612N, Landing Drive, Marietta 30066 GA) and is called Deskpak Desk Accessories. Neither of these disks are copy protected, allowing them to run quite happily from a hard disk.

Some of the NDAs fall into the category of fun, and I must admit to sometimes falling into the trap of trying to solve a puzzle rather than getting on with the work at hand. For example, I can shift squares around, puzzle over Enigma, and generally waste time. I have also seen a Tetris type NDA which has to be the ultimate time waster. But, more to the point are the utilities that are useful rather than

mere entertainment. Here's a summary of some of them, though I cannot remember which software package they came from, as they all appear in one list. After all, an NDA is simply that, and its origins are sometimes lost.

Times 3 is a routine that shows the time and date. If selected to do so, the time can be left on display to the right of the menu bar. Clock is similar to Times 3, except both the date and time can be left activated, positioned anywhere on the screen. The Alarm Clock utility makes a horrible noise and flashes the screen border at a preset time. It's great to make you stop and go to bed. The Calendar shows any month or any year. Appointments is similar to Calendar, but includes appointments for each hour from 8am to 5pm for any day. The Phone Filer allows entry of a range of names, addresses and phone numbers. And, it can auto dial the selected phone number.

A most useful NDA is Screen Saver. This routine blacks out the screen if no activity has occurred for a preset time, saving phosphor burns. For those with a need for security, you can add a password to a disk with Password, perhaps recording the password in a Scrapbook NDA. Other utilities include an ASCII listing, a memory usage indicator, a mini database, a routine to print a selected file without leaving the Finder, a macro writer to cause a specified key press to print a preset string, and so on.

There are an increasing number of NDAs available, often as public domain, and the GS User's Association is one source I'm aware of (its address and phone number is given above). Most user groups would also have these, and I recommend their addition to your system as they can make life just that much easier. However, be careful with NDAs, as some can prevent ProDos 8 software from running. At the moment, I cannot boot Appleworks (classic), due to an NDA conflict. As I now use Appleworks GS, I have decided to leave my NDAs active as they are so useful.

On things problematical, I have found that the trash can icon in System 5.0.2 disappears when I delete a file. However, it reappears when the Finder is re-entered from a program. Things ain't perfect yet! Next month, I hope to present a review of WordPerfect, one of the few text based wordprocessors available for the IIGS. And, to balance things, hopefully a more complete look at the latest revision of Appleworks GS. □



JOHN
HEPWORTH

PC Write

THERE ARE FEW more vital programs than wordprocessors. Kids may just play games on a PC, and get away with nothing more, but virtually all other tasks demand some sort of program to create and edit text files. From writing a batch file, to creating source code for a Basic, dBase or other program, through to writing letters, essays and books, a wordprocessor is the foundation of your software library.

In the Underground, there are many highly regarded wordprocessors, but PC Write is probably the best-known offering. It has been around for many years now, and was one of the pioneering products in the Shareware revolution. It is a very powerful program, and can do many, if not most, of the wordprocessing tasks of enthusiasts, writers and small business users. It is as suitable for letters as it is for major writing projects.

For some time, I have refrained from reviewing PC Write in this column for just one reason. This column is for public domain and Shareware software. For the last few years PC Write was Shareware only in the US and Canada, but was commercial software in the rest of the world. Late in 1989, it was agreed that PC Write would again be Shareware in Australia and New Zealand, thus becoming eligible for mention here.

PC Write requires either a double floppy system, or a single floppy plus hard disk. Most common video systems are supported and there are a vast array of printers for which definition files are included in the package. Printers supported include a large range of dot matrix and daisy wheel printers, plus several laser printers, including PostScript printers. Mouse support for Mouse Systems, Microsoft and Logitech mice is included.

The biggest file which can be edited is limited only by available memory, as all of the file is loaded into memory. With a 640K machine, and not too many TSRs active, editing a 300K file is possible.

Installation is easy. PC Write takes up three 5¼ inch disks, or their equivalent on your favorite bulletin board. One is titled Program, and the others are Utility and Reference. PC Write may be used on sys-

tems with or without a hard disk, and a comprehensive batch file takes care of installation. All the user has to do is create an appropriate directory on the hard disk, or have enough formatted floppies on hand, run the installation batch file and follow the prompts.

The batch file then asks a series of questions about the system on which PC Write is being installed, including the type of printer to be used, and copies files as required.

*I would hesitate to
recommend PC Write as
a heavy-duty office
wordprocessor.*

Running PC Write

AFTER COMPLETING the installation, make sure that the path statement in your Autoexec.bat file includes the name of the drive and directory containing PC Write. Now change to the directory for your document files, and type ED to start PC Write. The initial menu includes, as one of its options, the selection of the file to be created or edited. Alternatively type 'ED filename.ext' at the Dos prompt. Now, as PC Write is loaded, it in turn will load the selected file and by-pass the opening menu, going straight to the typing screen.

The top four lines of the screen are used for reminders to the user, with the rest of the screen being used for typing. Of the four top lines, the very top one gives status information like the name of the file being edited, the number of lines in the file, and the number of the line with the cursor. The next two lines give the actions assigned to function keys F1 to F10.

The fourth line shows the current ruler line, with margins, indenting, tabs and so on, being displayed. A little symbol for the cursor moves across the ruler line as the cursor moves through the text.

PC Write offers all the usual block moves, indenting, hanging indents and so on, that are part and parcel of any wordprocessor. It creates files which are predominantly in ASCII, complete with hard carriage return/line feed pairs at the end of each line, and two CR/LF pairs to mark the end of a paragraph. Naturally, it has on-line help, and spell checking, though unfortunately, the spell checker is rather slow and does not offer alternatives to unknown words.

Line drawing is possible, by individually entering those high-bit graphics characters, or by marking a box of text and automatically drawing a single or double line around the box. Where the box only occupies one row or column, a vertical or horizontal straight line is the result.

Formatting is done in various ways. Paragraph formatting (including margins, tabs, indenting and justification) is done with ruler lines. These are inserted in the text, and take effect till the next ruler line is encountered. Characters are formatted by inserting a formatting character at the start and end of each attribute. For example, to underline several characters, place the cursor at the point where the underline is to start and finish and press Alt-U each time. Similarly, pressing Alt-B at each end of a block gives bold, Alt-C is compressed, Alt-D is double width, and various others give a variety of character formats. PC Write uses dot commands to insert other information into the file, and these are interpreted when the file is printed. They are also used to control such things as page length.

Oddities

WHILE PC WRITE is powerful and effective, it does have its oddities. As an example, the Insert key is not used to toggle between insert and overwrite modes. That job is done by the Scroll Lock key. The up and down cursor keys move the cursor in the conventional way, and scroll the screen when they reach the top or bottom, but the page up and down keys don't jump up or down one screen, they merely scroll the whole text up or down one line.

When entering text for the first time, it automatically word wraps as the cursor

hits the right margin. If text is inserted or deleted within a paragraph, only the line being extended is reformatted with preceding and succeeding lines remaining untouched. It is necessary to put the cursor into the paragraph and press F7 to reformat the paragraph from the cursor to the paragraph end. Entering a tab into text is not done by pressing the traditional tab key, but by Control-I.

None of these are really troublesome, and while to a degree, PC Write follows its own keyboard conventions, it is still easy and efficient to use. For those old hands who are familiar with WordStar commands, many of the cursor movement commands of that famous old package are also recognised by PC Write.

On the distribution disks are two compressed documentation files, along with utility programs to expand and send them to a printer, screen or file. When expanded, they are an 18-page tutorial and a 75-page quick guide to PC Write. Separately available are a soft-cover manual or a 450-page hard-cover manual, of which 50 pages are an excellent tutorial.

The manuals on disk are quite enough

to get started and fairly evaluate the package, while the soft-cover and hard-cover printed manuals have very complete information on the nuances of the product. The printed manuals were written and set with PC Write and are a testimony to the power of the product.

PC Write is available in various forms, as is typical of much Shareware. First, of course, look on a convenient bulletin board or in your user group library. Secondly, go to a commercial Shareware library like PC Sig and get an evaluation copy. Finally, register and get a full copy of PC Write complete with a printed manual (hard cover or soft cover).

The review copy was a fully-registered copy of version 3.02 of PC Write, and came from the Australian distributors, Manacom Pty Ltd, PO Box 509, Kenmore 4067 Qld; 008 77 7601. They offer PC Write in several packages, all fully functional. They range from an unregistered set of disks at \$20 including postage, to a fully registered copy with hard cover manual and one year's support at about \$200. In between are various other combinations of disks, manuals, registration and support.

Conclusion

PC WRITE IS equally suitable for writing letters, essays or books. It is just as good at writing batch files and source code for your favorite compiler, as it creates plain ASCII files without embedded commands. Just remember to turn off word-wrap!

I would hesitate to recommend PC Write as a heavy-duty office wordprocessor. It is fast and has a comprehensive range of features, but is hampered by a somewhat clunky user interface and idiosyncratic set of commands. Even so, I know a number of users in big organisations who have taken their own copies of PC Write to work, rather than use the commercial package selected by the boss!

PC Write is an excellent entry-level wordprocessor, particularly for the home user who has just bought a PC and can't afford one of the industry leaders. It is an economical way to get started and is quite capable of doing virtually any task this type of user could require. Best of all, the user can ethically borrow and try a copy, and only register when sure that usage will continue. □

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TIM
HARTNELL

Work and relax

THIS MONTH, WE'LL be looking at a Basic program to set up your screen for turtle graphics on the PC, further ways to modify the A> prompt when working with Dos on the PC, along with some very good ideas for creating 'new commands' in Mallard Basic on the PCW. A reader in NSW also tells how he is very pleased with the purchase of a PCW statistics package from the UK. Finally, to ensure you get a chance to relax with your PC from all your hard work, we have an alphabetical mind-stretching game.

Modifying the prompt

THERE ARE MANY ways you can modify the A> prompt on the PC. Last month we looked at some of the simpler ones, such as typing in prompt \$t to get the time to come up in place of A> prompt, and prompt XXX to replace the A> with XXX. You can, of course, use any string you like in place of XXX for your own prompt.

In this article, we'll look at a few other ways of using prompt.

You follow the command prompt with a string name which tells the computer what you wish to appear on the screen. The string label for the current drive letter is \$n, and \$g is the familiar greater than character. Therefore, if you've changed the prompt to, say, ##, by typing in prompt ## and pressing the Enter key, you could restore it to A> by typing in prompt \$n\$g.

Here is a full list of the options available with Dos to change the prompt. In each case, you enter the word prompt followed by the relevant letter preceded by a dollar sign to modify the A> prompt as you choose -

```
t - the current time
d - the current date
p - the current directory
v - the DOS version number
n - the current drive letter
g - the greater than symbol (>)
l - the less than symbol (<)
v - the vertical bar (|)
q - the equals sign (=)
h - this backspaces and erases the previous character
e - the escape character
- - starts a new line
$ - the dollar sign itself
```

- you can combine these to produce some weird and wonderful prompts, including the computer using your name each time it expects an input, or tells you the time, date, directory and so on, all in a long line.

Turtle graphics

BASIC2 IS PROVIDED with a number of Logo graphics commands, but they are not particularly easy to use, because of a few decisions made by the people who wrote the program.

Thirteen year old Dougall Irving, of Victoria, has written the program given in Listing 1 to overcome a few of the disadvantages. At

```
'-----
'TURTLE GRAPHICS SET UP PROGRAM
'-----
' DOUGALL IRVING - WOODSIDE
'-----

CLS
WINDOW OPEN
WINDOW FULL
GRAPHICS CURSOR 3
LOCATE 40;10
'towok in radians, change next line to OPTION RADIANS
OPTION DEGREES
POINT 90
'-----
'BEGIN PROGRAM HERE
'-----

LET x=RND(180)
FOR j=1 TO 360
  FD 1300
  RT 90
  RT x
  FD 1300
  RT 2
  j$=INKEY$:IF j$("<)" THEN RUN
NEXT j
```

Listing 1. Thirteen year old Dougall Irving, of Victoria, wrote this Turtle graphics set up program to overcome a few of the disadvantages of Basic2's Logo graphics commands.

Dougall's school they use IBMs and Apples running Logowriter, and Dougall's brief program makes the Basic2 graphics operate in a similar way.

The program sets the turtle up in the middle of the screen, facing straight upwards, rather than beginning in the corner as it does if you do not change it. The set-up program itself runs till the

line Point 90. After this, Dougall has provided a sample program which generates patterns using a randomly-determined starting angle. Press any key to change the pattern, and Control C to stop the program running.

New Mallard commands

CLIVE MELLOR, of Payneham in South Australia, has been spending quite a bit of time lately programming the PCW in Mallard Basic. He says that he has created a number of strings which can be printed to emulate commands which are available in other Basics, and are somewhat simpler to use than the convoluted versions supplied with the language itself. He suggests you define the required 'words' at the start of your Mallard Basic program, and then Print the required word when you need to trigger the command.

He suggests e\$ (for 'escape') should be set equal to CHR\$(27); ivid\$ be set equal to e\$+'p' to invert the video; vid\$ be set to e\$+'q' to reset it; coff\$ be set equal to e\$+'f' to turn the cursor off; with con\$ set equal to e\$+'e' to get it back on; ulon\$ be set to equal e\$+'r' to turn underlining on, and uloff\$ be set to equal e\$+'u' to turn it off; cls\$ should be set equal to e\$+'H'+e\$+'J'+vid\$+uloff\$+cos\$ to clear the screen and set all back to the default settings; and bel\$ be set to CHR\$(7); in order to sound the beep.

PCW statistical software

PETER AROHA, from Cessnock in NSW, is a PCW user who says he has recently bought a very good statistical package for his computer from England.

'I have used my PCW a lot over the past three years but I wanted to get even more use out of it, especially as the statistics part of my current university course was becoming very demanding.'

Peter bought a package called Stats from Nairana Software, River Bank, West Molesey, Surrey, LT8 9QX UK, for twenty pounds, and says it has proved a very worthwhile purchase.

'With this package, my PCW can now do stuff like producing line plots, scattergrams, bar and column charts; it also does one- and two-way Anova's; multiple regression with up to three independent variables; the T-test and chi-square tests of significance, along with non-parametric tests such as Wilcoxon and the Mann Whitney.'

Mastering your alphabet

ALPHABETICA (LISTING 2) is not a program to teach you the ABCs. Instead, it allows you to play a kind of 'mastermind' game against your Amstrad PC running Basic2, and instead of having to break a code of colors (as in the commercial Mastermind game) you have to work out which four-letter code (using the letters A, B, C, D, E and F) the computer is thinking of. Any correct letter in a correct place earns you an asterisk (*), while a correct letter in the wrong position gives you a plus sign (+).

We'll be including 'Your Amstrad' in future issues of the magazine. I'd be interested in hearing from any companies making, or importing, software and/or hardware for any of the Amstrad computers. As well, I'd be more than happy to share any of your discoveries, hints, tips, comments and programs with other users, along with details of any Amstrad-specific user groups. A copy of my *Amstrad PC Users Companion* (disk and manual) will be given to anyone supplying PC hints which are used in this column. A disk entitled 'Best of Your Amstrad', complete with reprints of the

```
REM Alphabetica- Tim Hartnell - Your Computer
DIM a(4),b(4):y$="":l=0:CLS:RANDOMIZE VAL(RIGHT$(TIME$,2))
FOR z=1 TO 4:b(z)=INT(6*RND)+1:y$=y$+CHR$(64+b(z)):NEXT z
PRINT "Choose from: A B C D E F"
'*****
' Main Cycle
100 l=l+1:PRINT "Enter guess number";l
110 INPUT x$:r$=x$:IF LEN(x$)>4 THEN 110
k=0:j=k
'*****
FOR z=1 TO 4
  a(z)=ASC(x$)-64:b(z)=ABS(b(z))
120 IF a(z)<>b(z) THEN 130
  k=k+1:a(z)=0:b(z)=-b(z)
130 x$=RIGHT$(x$,(LEN(x$)-1))
NEXT z
'*****
FOR h=1 TO 4
  z=1
  140 IF a(h)<>b(z) THEN 150
  j=j+1
  b(z)=-b(z)
  GOTO 160
  150 IF z<4 THEN z=z+1:GOTO 140
160 NEXT h
'*****
PRINT:PRINT r$;" scored ";
IF k=0 THEN 170
FOR z=1 TO k
  PRINT " *";
NEXT z
170 IF j=0 THEN 180
FOR z=1 TO j
  PRINT " +";
NEXT z
180 PRINT:PRINT
IF k<4 AND l<=9 THEN 100
IF k=4 THEN PRINT "You did it in";l;"guesses."
PRINT "The code was ";y$
END
```

Listing 2. Alphabetica is a 'mastermind' game for Amstrad PCs running Basic2. The player must work out which four-letter code (using the letters A, B, C, D, E and F) the computer is thinking of. Any correct letter in a correct place earns an asterisk (), while a correct letter in the wrong position gives a plus sign (+).*

best PC-specific material from the column, is also available from me. Just write for details. I have some CPC software to provide in return for CPC hints. Please write to 'Your Amstrad', Tim Hartnell, *Your Computer*, PO Box 227, Waterloo, 2017 NSW. □



JOHN
BAILEY

The Star Micronics NX-15

EVERY TIME I look around someone has built something new. So new that the software houses haven't guessed at the extent of the horizons offered. Last year, I traded my old Epson for a Star Micronics NX-15 printer because I fell for the extra ability of the machine. My software could cope with all that it had to offer and I was a very happy child.

I was recently lent one of the latest 15-inch printers from Star Micronics and I am once again petulant, moody and angrily searching my bank-book for extra funds. The machine in question is not a glamorous ink-jet or laser engined miracle. It is a simple 9-pin dot matrix printer with a color option.

This machine is rated at 250cps (characters per second) in draft mode and 63cps in NLQ mode. If color is used frequently, then the printing speed is slower because of the need to shift the print head up and down and the several passes made to print composite colors. It is capable of variable line spacing and can be programmed to any one of 5 fonts within four character sets. The paper handling on the bare bones machine consists of an automatic fanfold parking option and auto load of the cut sheet or fanfold depending on the location of the friction selector lever.

The expenditure of more dollars will bring automatic sheet feeding and so forth, but being a simple mendicant, I was not able to sample this delight. The printer has a program built into it that enables us to select the manner in which it will start up. We can select from seven fonts in condensed or normal width print and colors that would be the envy of Jacob.

The printer can be influenced from the DIP switches, like most common printers, to produce the standard character sets, but it may also be made to emulate either an IBM or standard (Epson) printer. I used the machine in the Epson mode because most of my software has not caught up with this piece of hardware, and it seems that Epson came out with the EX 800 and 1000 series printers before the IBM Proprinter II which is supposed to be the nearest thing to the FR 15. Naturally, my

poor old pocket doesn't extend to a Word-Star version late enough to fully utilise the fonts and the color of the FR 15.

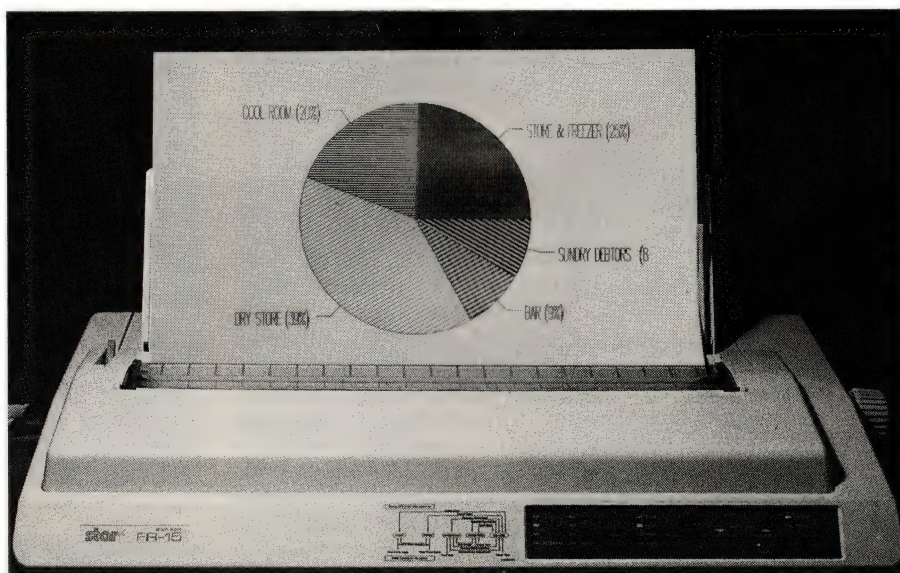
The use of color in printing and plotting is marvelous for displaying different parts or stages of a plan or program.

Programming the printer

TO PROGRAM THE printer, one must hold down a couple of the panel buttons and turn it on. This action prints a command line on the paper in the printer. (It is supposed to have paper in it when you switch on, if it doesn't, it will produce that infernal beeping noise – some things never change.) By pressing the relevant marked button, the print head is placed beneath the desired option as printed and one may

select the default values of the printer at start-up. It is very clever, very easy and beats the hell out of configuring software – up to a point. Sometimes, one might like to be a little different and run a Header in a different font. I found that the best trick is to include a 'pause print' command in the file to be printed and change font by pressing the off-line switch and changing the light on the display panel to the desired font by pressing the correct switch repeatedly until the display has illuminated the required font. From there, it is a simple matter to restart printing via the on/off line switch and the depression of the button prompted by the software, a 'C' in my case, and lo' and behold, we have a new style of print.

Why prithee, I hear you ask, should a soul desire to change font or style in the midst of a document? Well perhaps a point within your discussion needs emphasis, or your argument is weak at that stage and a change may distract your detractors. How should I know already? But it is lovely to know that one might do it should one so desire. In a more serious vein I suggest that presentation is a very



The Star NX-15 printer can print in either black or color, and a range of fonts are included.

important part of any argument, be it of a philosophical or commercial nature, and here is an instrument that allows us to use color and a variation in type-style at a very reasonable price to make an attractive conveyance for our case.

The use of color in printing and plotting is marvelous for displaying different parts or stages of a plan or program. The existing structures may be listed or drawn in black, extensions or work under way may be done in blue, and proposed work could be marked in red as the mood may take us, but the whole will be presented as a series of stages laid out in color for all but 1 in 250 of us afflicted with a deficiency in our color appreciation. I make this point because the producers of many dazzling displays are guilty of creating a mess when viewed by folk with a color disability. A little thought could arrange something better. The Department of Civil Aviation, in one of its guises, produced charts in predominantly red and green. This was a bit hard on people with red-green color problems who wanted to fly at night. But, that was OK because it was one of the reasons color blind people weren't allowed to fly at night. For every advance there must be a retreat, and the advent of color printers is not exempt from the rule.

*For every advance there
must be a retreat, and
the advent of color
printers is not exempt
from the rule.*

I love new gadgets as much as the next person, and this gadget has many fonts and colors to tempt me. I must resist the temptation to confuse readers of my newsletter, or viewers of my diagrams with a bewildering array of colors and type-styles. There are many examples of this over-use of all the gimmicks at once, and the argument can become lost in a forest of fancy colors and fonts. The other minus is in ribbon cost – those fancy colored ribbons cost a fair bit and cannot be re-inked. If you just want to print in plain mode, it is best to use a standard black ribbon and save the color one for special tasks. The ribbons are easy to change and



A sample of the fonts available on the Star Micronics NX-15.

the printer simply ignores color commands sent to a plain ribbon.

The price of the FR 15 is naturally greater than the price of a narrow printer and it costs less than a lot of comparable wide carriages machines. The NX 15 prints labels quite well, but mine is a little inclined to smudge them, so the FR 15 was given a set of labels to print in both one color and multi-color modes. The smudging problem appears to have been solved. Colored labels for mailing or identification of jars, disks or personal items can be made to look quite striking. We use mail-

ing labels for marking some of the boys' items when they go away from home – it's cheaper than engraving and nearly as hard to remove.

The manual

THE MANUAL FOR the FR 15 is written in plain English and everything is laid out very clearly with a good index and table of contents. It costs under \$1300 and if you can't find a dealer that handles it, try the distributors, Star Micronics Australia with offices in Brisbane, Sydney, Melbourne and Perth. □



GREGG FAULKNER

A few of my favorite...

NOW THAT THE euphoria of the Christmas season has faded to a dull ache in the general region of the BankCard, it may be timely to devote some space to new Amiga owners. Most Amigas bought for Christmas were the 500 model, and they were bought for the usual reasons – for the kids' school work, a bit of word processing, maybe a database application or two. Let's be realistic though: since the boxes were opened the only things that have appeared on screen have been games.

I don't mean to be disparaging about games, there are some brilliant examples available for the Amiga, Populous and Sim-City spring immediately to mind, and they are a good way to become familiar with the controls on the Amiga.

The time comes, however, when we start to look beyond the games and decide to make productive use of the PC. The Amiga is, above all, a productivity machine. Within that fawn colored box sits computing capacity that any large business would have been very happy to own 15 years ago.

Where to start? Let's take word processing as a first case to study. There are in excess of 30 different word processing packages available in Australia for the Amiga. They range from absolutely awful to superb, and their prices range just as far. Before recommending any particular package, I would like to know something about your intended use of the Amiga.

Are you likely to want to transfer document files between your Amiga and another machine? If so, what type is the other machine? The Amiga can easily read, write and format disks for use in Atari and MS-Dos (IBM compatible) PCs which will make file transfer easy. Even Macintosh disks can be handled with the addition of the A-Max device to the Amiga.

If you are likely to want to transfer files between machines, it would be wise for you to consider industry standard packages such as WordPerfect or Protext which are widely used in other environments. If transfer is not an important consideration, then a wide world is open to you.

Some people recommend buying a 'simple' word processor for your first ex-

perience. I am not one of those people. I believe it is much better to buy a top quality, full function package right from the start. You can initially use only a few of its facilities, and gradually grow into the more complex functions. In years to come, you will be satisfied with the same package, and over the time you will have come to learn all its capabilities.

Full-function word processors available for the Amiga include Excellence!, Scribble Platinum Edition, Kindwords 2.0, and now Pen Pal. All of these packages provide spell checking against a large built-in dictionary, and thesaurus functions. In varying degrees they also support graphics within the text. In my opinion, Pen Pal is the pick of this bunch, with Kindwords 2.0 in second place.



Desktop publishing packages for the Amiga aren't yet up to scratch for business use. At around \$400 Professional Page v1.3 has priced itself out of the home market, yet it is \$600 too cheap to be credible in the business market.

Graphics

THE NEXT MOST useful package for the Amiga is a good graphics package. There is a huge range of graphics software available for the Amiga, and I've become very fussy in this area. To gain my approval, a graphics package has to provide a wide range of drawing and coloring facilities, and be easy and intuitive in use.

In my opinion one package stands out, head and shoulders above all the rest – Deluxe Paint III. Not cheap, at nearly \$250 rrp, it is nevertheless excellent value for money. Deluxe Paint III is, as the name suggests, the third generation of Deluxe Paint packages which have evolved to the point where they make excellent use of the Amiga's graphics capabilities.

Deluxe Paint III permits drawing and animation in the full range of screen resolutions and color modes, except HAM mode. It does support extra half-brite mode which allows 64 colors on screen. The animation facilities are stunning, and the package can be used by the whole family as a genuine productivity tool.

Only half a step behind Deluxe Paint III, in my estimation, are DigiPaint III, Express Paint 3.0, and Photon Paint II. All are very good packages, at least equal to the very best available for other PCs, and each with its own particular strong features. Photon Paint II has animation capability, though I don't feel it is as simple to use and effective as that of Deluxe Paint III.

Spreadsheets

THE THIRD MOST useful package for home use is a spreadsheet – these are the most commonly misunderstood packages. In the simplest form, a spreadsheet is rather like a multi-column accounting book. Columns can be headed, for example with years, and rows can be headed with, say, income, expenditure, and savings.

A good spreadsheet package these days also contains database and chart graphing capabilities, so it can provide a number of capabilities for you for the price of one package. My favorite spreadsheet for the Amiga is MaxiPlan, and it's available in two versions – MaxiPlan 500 is designed for the Amiga 500 (or 1000) and requires only 512K of memory to operate; and, MaxiPlan Plus requires the extra memory of an Amiga 2000 or expanded 500, and works best with at least 1Mb of memory. In use, both versions are identical with the exception that MaxiPlan Plus permits macro functions to be designed and used.

MaxiPlan can read and write worksheets compatible with Lotus 1-2-3, so it is a

simple matter to transfer data between the Amiga and MS-Dos computers. There are other Amiga spreadsheets which bear amazing similarities to Lotus 1-2-3, in particular is a package called VIP-Professional.

To my mind, running a 1-2-3 clone on the Amiga is a bit like putting kerosene in your Porsche. MaxiPlan is so much more friendly and colorful, and even supports the Amiga's speech capabilities. I regularly use both packages and I sure know which one I prefer.

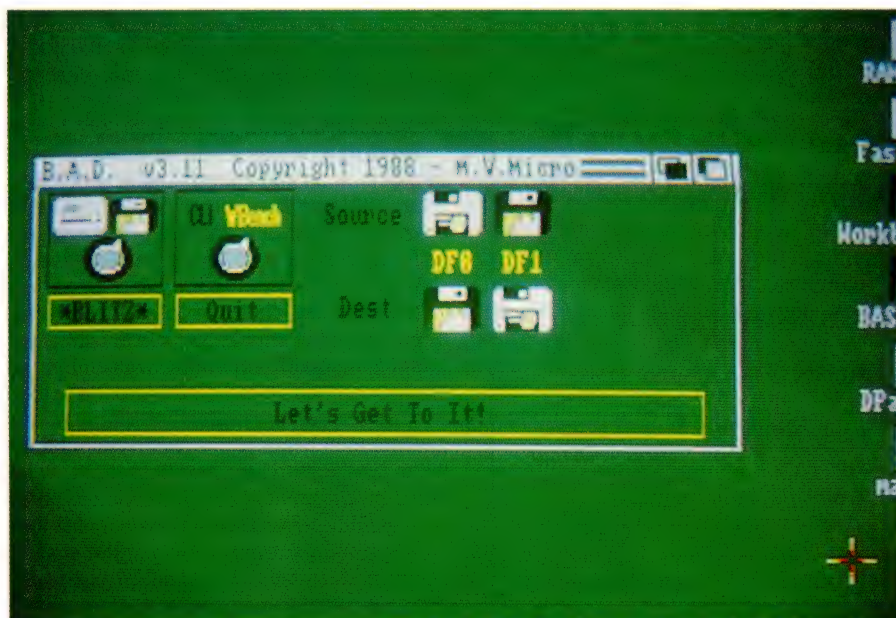
Other good spreadsheets available for the Amiga include Analyse! 2.0 and SuperPlan. At the lower price point are Budgeteer and Haicalc, which don't provide all the bells and whistles of the top level packages.

I guess databases should get a mention, though I am personally not madly keen on them for home use, preferring to use a good spreadsheet package wherever possible. If you want to spend around \$600 for a database, Acquisition and SuperBase Professional are the insect's trousers in Amigaland. At the more modest level of around \$250 are Professional Dataretrieve and Microfiche Filer Plus, which are both nice packages to use though dramatically different in concept. Down at around \$200 are SuperBase Personal, Miamiga File and Omega File. Tail-enders, though useful for specific purposes, are Mailshot Plus and Data Retrieve, and the useful package Organise! is now bundled with The Works!.

Desktop publishing packages for the Amiga are, despite promotion to the contrary, not yet up to scratch for business use. They are, however, fantastic for the home user. My favorite in the value-for-money stakes is PageStream, though the updated version of Professional Page, version 1.3, is very nice too.

*The time comes,
however, when we start
to look beyond the games
and decide to make
productive use of the PC.*

At around \$400 Professional Page v1.3 has priced itself out of the home market, yet it is \$600 too cheap to be credible in the business market. Rumor has it that



Utility software can make any user's life easier. The most useful utilities in my collection are DiskMaster (a general purpose file examiner and mover), Dos-2-Dos (which takes care of transferring files between Amiga and MS-Dos formats), BAD Disk Optimiser (which speeds up floppy disk access remarkably), and Diskwik (which enables recovery of deleted files and saving contents of damaged disks).

version 2.0 of Pro Page is going to be a full-blooded business package. I hope it is. For the sake of the Amiga's push into the business world, we desperately need either Pro Page v2.0 or the rumored Amiga version of Xerox Ventura to put the Amiga firmly in the market alongside PageSetter and Ventura.

Shakespeare v1.1, at \$370, is in the same boat as Pro Page, while City Desk v2.0 and PageStream barely make it into the home market at \$279 and \$259 respectively. At the lower price end are Page Setter and Publisher Plus. The cook wishes it to be known that one of her favorite packages is Printmaster Plus, which keeps the whole family supplied with calendars, cards and posters, for a modest \$60 or so.

Utility software

FINALLY, I MUST draw the attention of the new Amiga owner to utility software, without which life is much more trying. The most useful utilities in my collection are DiskMaster (a general purpose file examiner and mover), Dos-2-Dos (which takes care of transferring files between Amiga and MS-Dos formats), BAD Disk Optimiser (which speeds up floppy disk access remarkably), and Diskwik (which

enables recovery of deleted files and saving contents of damaged disks).

Other useful utility software include GOMF v3.0 (recovers from system crashes), Marauder II and Raw Copy (which get around some publishers' idiotic insistence on copy protection), and Grabbit v2.0 (which lets me capture any screen image to a file which can be printed or loaded into graphics packages).

Between them, my utility packages have helped retain my dubious sanity in times of dire stress. Bless them all. Overall recommendation for the new Amiga owner? That's the magic question. Deluxe Paint III is a must. After that ... The Works! Platinum Edition, for under \$400, contains a useful word processor - Scribble!, spreadsheet - Analyse!, database - and Organise! all in one package and that's good value for money.

AusGen

IT'S NOT OFTEN enough that I have the opportunity to review Australian made Amiga hardware, but I'm pleased to be able to write a very favorable review of the AusGen genlock.

A genlock is a box of electronics which, in basic terms, synchronises the output of

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a computer with the output of a video device, such as a video recorder or camera. Having synchronised the two signals, the genlock then permits various combinations of the two signals to be output to a monitor or another video recorder.

The Amiga lends itself very favorably to genlocking as the output image is video-compatible and a genlocking input is provided as part of the parallel port circuitry. Still, there is a world of difference between doing a job and doing it well.

The AusGen does the job very well indeed. From his small production facility in Sydney, David Thompson has assembled a component which is well finished, reasonably priced and very effective. The AusGen genlock is contained in a metal case, 11cm wide by 14cm deep, and less than 3cm high. On the front of the fawn colored case is a single red LED and a three-position toggle switch. From the rear of the case a short lead ends in a female 23-pin plug, designed to fit into the Amiga monitor socket.

All genlocks perform basically the same function, and the difference between genlocks is primarily the quality of the signal output from the device. I have compared the AusGen with several other genlocks costing considerably more, up to five times more in one case, and it rates right up there with the best.

Using a genlock

LET ME EXPLAIN the process in using the genlock to create titling for a home video. First, I create the title image using Deluxe Paint or any of the other Amiga graphics packages. I leave the background plain behind the text. Next, I play the original video material from one video recorder into the genlock, overlay the title image with the genlock, and record the combined output on a second video recorder.

Using this technique the computer generated image replaces the incoming video image in all but areas of background color. Where the background color existed in the computer image is now replaced by the source video image.

The AusGen provides clean edging at the borders between computer and video images and produces a very clean output signal. I have tried copying the resulting program through another two generations of normal VHS video and the result was very marginal, but I feel that's characteristic of VHS rather than the genlock.

Using fully saturated colors, that is, pure red or blue or green or any other color produced by setting the color sliders to maximum in Deluxe Paint, is unwise

when using a genlock. The AusGen unit did no better and no worse than any of the other units, some costing over \$2,500 in this regard.

There were a couple of minor points about the AusGen which I didn't like - I have drawn these to Thompson's attention and I understand he is addressing them. One was the very short, 10cm long cable to connect the AusGen to the Amiga. It made connection to my A2000 very awkward. The second was the sample images supplied on the software disk, which were of amateurish standard and didn't do justice to the hardware they are supporting.

The documentation supplied is brief, though well written and easily understandable. All in all, the unit has been nicely built and finished, and well presented. Above all else, it's very reassuring to know that the manufacturer is only a phone call away should the unexpected eventuate.

At \$549 rrp, the AusGen is excellent value for money, and puts high quality genlocked video within the reach of the home enthusiast. Try your local Amiga retailer or David Thompson on (02) 639 6686.

*There is a world of
difference between doing
a job and doing it well.*

Hardware for new users

EARLIER IN THIS column, I gave the new Amiga owner an overview of software available in Australia. Now, I would like to briefly mention available hardware items to expand the capability of your Amiga. A bare-bones Amiga 500 is supplied with 512K of memory and a single internal floppy disk drive. This configuration is OK to begin with, but very soon the limitations become obvious. You can get very sick of swapping disks all the time, and an increasing number of packages require at least 1Mb of memory.

The obvious question is, which should come first: a second disk drive or expansion memory? Not all of us have the readies to buy both together. Which provides most immediate benefit?

In my opinion, a second floppy disk drive is more important than expanded memory. A disk in the second drive can

store data created during your session, permitting your program disk to be kept in the internal drive, removing the need for disk swapping.

The second drive takes much of the load off your internal drive, and the greatly reduced need to swap disks will minimise wear and tear on your internal drive. Duplicating disks is a breeze with two drives, particularly when compared with the disk-shuffle involved with a single-drive system.

With two drives and still only 512K of memory, you will be unable to use a few software packages, but they are few, and there are adequate alternatives. The biggest constraint I feel with 512K of memory is the limits imposed upon my graphics and animations.

Fortunately, the price of memory chips is dropping fast and expansion memory will very soon be within the reach of all Amiga owners. Most of the commercial memory expansion modules also include a real-time clock. This is a device similar to a digital watch, powered by a built-in battery, from which the Amiga can read the current time and date.

Expansion memory helps the Amiga to run a little faster, as well as permitting the user to be more creative with graphics and animations, and very long documents. New Amiga 500s are being shipped fitted with the Obese Agnus chip. This new component permits the co-processor chips to access a full megabyte of RAM instead of the old 512K of 'chip RAM'. This enables you to use more colors in high resolution graphics, and much larger sound samples can be recorded and replayed.

I have 3Mb of RAM in my Amiga 2000, and I occasionally find myself wishing I had another 'couple of meg'. Under version 1.3 of the Amiga operating system, it is simple to install a non-volatile RAM disk, and even enable the machine to warm-boot from the RAM disk. This can save a tremendous amount of time and disk swapping, particularly while testing and debugging new programs.

Perhaps I should pause to explain the term 'warm boot'. I have frequently encountered owners switching the power off and on to clear a software jam in the machine. Apart from the harm this practice is likely to cause to the power supply and other components, it is completely unnecessary.

It is simple to instruct the Amiga to start again as though it had been powered off, but without powering it off. This simply involves pressing the Control and left and right Amiga keys simultaneously. The

left and right Amiga keys are those keys located immediately at each end of the space bar. On some 500s the left Amiga key is labeled with the Commodore logo.

The term 'warm boot' derives from the concept of 'pulling itself up by its bootstraps' and dates from the earliest days of computers. The adjective 'warm' is used because the power is not switched off. And, for anyone interested, yes, if you do turn the power off and on again, the process is then called a 'cold boot'. Enough about temperature dependent footwear.

As any Amiga owner who has tried both will agree, connecting the Amiga to a television set is pretty disastrous, the colors are washed out and text is nearly illegible. A color monitor is essential. For some weird reason Commodore choose to include the video modulator with the Amiga 500 packs. I have difficulty with this approach. It invariably means that after discovering the futility of using a television set as a display and purchasing a color monitor, the owner is left with \$40 worth of useless video modulator.

*It is simple to instruct
the Amiga to start again
as though it had been
powered off, but without
powering it off.*

Printers

AFTER A SECOND disk drive and expansion memory, the next most useful addition to an Amiga is a printer. This is not so daunting an idea as it used to be. The relative price of printers has tumbled over the past couple of years, and the range to choose from has ballooned.

The Amiga 500, like the Amiga 2000, has an industry standard parallel port connector. This means that just about any printer designed for general PCs will be suitable. For me, a couple of machines stand out.

The Star 1000 series is a very nice 9-pin dot-matrix printer ideally suited to the Amiga. Printed output from the Star 1000 is crisp and clean. Printing is fast, and the printer is capable of full dot-addressed graphics printing. An optional color mod-

ule, together with a color ribbon, enables printing of quite good color graphics from the Amiga.

Don't be misled in the area of color graphics. Many point of sale and advertising displays show brilliant color graphics produced by computers such as the Amiga. What is not pointed out, except perhaps in the microscopic print, is that those prints were produced by high cost color ink-jet or even color laser printers.

Some people have been disappointed that the results from their dot-matrix printer are not so vibrant and brilliant as the promotional images. This is not due to any shortcoming in the individual printer, simply it's due to the limitation of a ribbon ink-transfer-by-impact technology.

Another printer I would strongly recommend is the Epson X range. I use an Epson EX-1000 for most of my work and I have been pleased with the speed, quality and reliability of the printer. Like the Star 1000, the Epson EX-1000 is a 9-pin printer and, again like the Star, a color module is available at a small extra cost. The EX-800 is the letter-width version in the range and is better suited for home use.

Another printer well worth a look is the Fujitsu DL3300. This is a 24-pin printer and somewhat more expensive than the 9-pin models. The extra quality in the printed output is immediately apparent. Curves are much smoother and the characters look very much as though they have been produced by a formed head like a typewriter or daisy-wheel printer. A color option is available for the Fujitsu.

I believe that Fujitsu are dropping 9-pin printers from their range to concentrate entirely on 24-pin technology. Obviously an indication of what the market wants. Epson also produce a range of 24-pin printers, the LQ series. After comparing the output from an Epson LQ-800 with that from a Fujitsu DL3300, I felt the Fujitsu printer produced more pleasingly smooth characters with less indication of 'dottedness'.

When you buy a printer for your Amiga, make sure that you check with the salesperson which printer driver should be used for the printer. In the Preferences facility of the Amiga, after selecting the Change Printer option, you are able to select from a large number of printer types. Make sure you select and save the correct type for your printer.

If you are using version 1.3 of workbench software, you will be able to tailor the output of your printer very accurately to produce precisely pigmented, perhaps, partially patterned, paperwork. □



RITA
PLUKSS

Word Writer ST

I NEVER THOUGHT I would see the day when I'd be using something other than STWriter for wordprocessing. But, here I sit, valiantly going through the paces with something else. The screen has a different layout, rulers along the top (which may be turned on or off), function keys displayed as icons along the bottom, and a window environment together with scroll bars completes the view that stares back at me from the screen.

The feeling could be compared with having traded in your old comfortable armchair for a newer, more modern design. You know it's better for you, but do you really want to say goodbye to something that you're *that* familiar with, to grapple with a new and yet strange replacement?

Timeworks contender in the wordprocessing field is Word Writer ST version 2.00, distributed by Dataflow, 134 Barcom Ave, Rushcutters Bay 2011 NSW; (02) 331 6153, and has a rrp of \$119.95. This is a two-disk set; the first disk containing the wordprocessing program and a number of printer configurations, the second disk has the dictionary and thesaurus.

Deciding to put Word Writer ST through its paces to write this review, and having a fair understanding of wordprocessing, I put the unopened manual to one side and booted up the program. Having loaded the program from the first disk and the dictionary and thesaurus from the second, I find that I have the luxury of a resident dictionary in memory which means I can have an automatic spelling checker turned on.

As I type, the cursor hesitates now and then and even has the occasional hiccup. If I turn the continuous spelling checker off, the program seems to speed up and no longer hiccups over my words. Continuing to work with the spelling checker operational, my typos are highlighted, which gives me the option of stopping and viewing the dictionary immediately, or if I ignore the highlighted word and keep typing, the highlight over the typo (or spelling mistake) disappears. These unchanged typos may be corrected at the end of the typing session by checking the whole

document. The choice is yours, check as you go, or check at the end.

Why bother?

SPELL CHECKING a document with Word Writer ST is a painful process. Although it highlights the misspelt word, to find the correct spelling one has to click on the view option to enter the view dictionary mode. Then the search through the dictionary can begin, and I *do* mean search! The search is strictly alphabetical, meaning it's not intuitive to any degree. An intuitive dictionary search is one that has a guess at what you may have meant, for example, typing *rihgt* instead of *right*, or *nto* instead of *not*. An intuitive dictionary would throw up a variety of alternative words for you to choose from. But, with Word Writer ST this does not happen, it searches the dictionary and when it doesn't find a match it brings up the next alphabetical word in a linear progression. This of course, means that you must know how to spell the word to start with as no clues are given. (Another strange thing – a wordprocessing package with an integrated dictionary, but the dictionary doesn't contain the word 'wordprocessing'.)

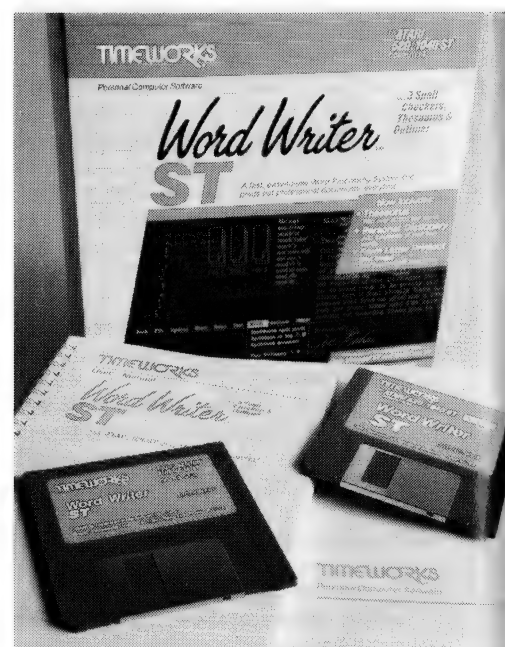
Personally, I find the dictionary option slow and cumbersome, mainly because of the lack of intuitiveness within the dictionary usage itself. The time it takes to view and search through the dictionary, I could have found the correct spelling of the word using a normal dictionary in less time. But, I guess the trick is to know when you have actually misspelled a word so that you can correct it. This is where using the continuous spell check option or spell checking the entire document is necessary.

If you type without looking at the screen, you will miss the highlighted misspelled words, although there is an audio beep to alert you to your errors, you may find it annoying. So, even if you do have the continuous spell checker turned on and the sound turned off (I dislike the audio feedback click when I type) it's still a good idea to do a final spelling check when you have finished.

Fun with the thesaurus

THE THESAURUS keeps me occupied with great interest while I find synonyms for all sorts of words, but in the end I stick to my original word usage (I tend to be set in my ways and vocabulary). A thesaurus is a handy inclusion to any writing package, and if used competently, can improve your writing style plus expand your vocabulary. The minimum usage that I have given it at this stage has not shown it in its best light, but it is something that I would expect in a good package. I won't be retiring my Webster or Oxford dictionaries just yet, but my trusty and well-worn thesaurus may get a well deserved rest.

I like the visual page breaks that are displayed on the working screen, which show at a glance whether I'm going to have a widow or orphan problem. Another nice touch keeps reminding me how many pages I have typed, or more precisely, which page I am currently working on. There is also an option that allows you to designate whether or not certain passages or complete paragraphs should be kept on the one page rather than being broken over two pages. Another handy feature is

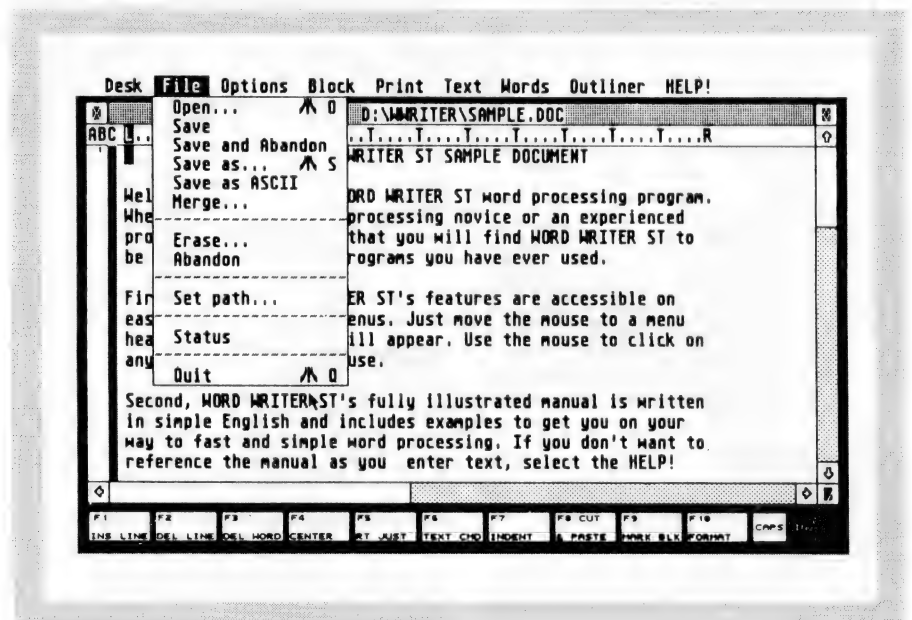


the Status report which provides a word count as well as a page count of the entire document. These types of features are not really a luxury when working on long documents where there are a number of considerations including spacing as well as table and layout designs for easier reading.

When formatting text, there is a choice between formatting each paragraph separately or formatting the entire document as a whole. Layout is organised through the options available via pull down menus, then clicking on the format text option. This is easy to use although I did have some trouble with formatting a document using the F10 key rather than the pull down menu, where it works perfectly. After checking the manual, I found that the fault was mine, the cursor has to be at the start of whatever you want formatted – logical if you think about it, as you may require different formats for different sections of your document.

The other various wordprocessing functions may be carried out either by mouse, key sequences or function keys, allowing for alternative work methods. Writers accustomed to working entirely from the keyboard are not slowed down nor hampered by having to stop and use the mouse. Those who are not so set in their ways and dependent upon the keyboard can drive the program using the mouse with its pull down menus and point and click operation.

The WYSIWYG (what you see is what you get) layout is good. Up to now, I have not really appreciated this visual aid to set out, as my main preoccupation has been with text, and all layout work has been undertaken by someone else or done through a DTP package. But, I must admit now, that there certainly is a place for WYSIWYG style word processors. The underlines, italics, boldface, superscripts and so on, are printed exactly as I have set them up on the screen. (And talking about printing... this review has taken me over two hours to print out. The automatic double spacing, auto justify and word wrap, having been activated a number of times on this same document seemed to have gone haywire. I had spaces all over over the place, and what was on the screen was exactly what I got on my print-out! The only way to get out of the problem in a hurry was to go through the entire document and remove each unwanted space before reformatting it to what I required, or so I thought. But that still didn't solve the problem. In the end, I used a utility called Sift to convert the text to



In addition to the comprehensive menu system, Word Writer also makes use of the Function keys for frequently used commands.

STWriter format, and then printed this review from there.)

Word Writer ST also provides a reasonably elaborate Outline function to help with organising the thought and writing processes. There are five levels provided which may be further subdivided as required to form very extensive and elaborate outlines, which may then be indexed and formatted to your own needs.

Other writing options

OTHER WRITING options available in Word Writer ST are a Report format and Form letters. The Report formats are versatile and the information to generate these reports may be brought in from other Timeworks programs which are compatible with Word Writer ST such as Data Manager ST (database) or Swiftcalc ST (spreadsheet). Personalised Form letters are also easy to construct. The required information may be brought in from various external data files as long as they are in ASCII format. The ASCII data files can then be accessed by Word Writer ST for information inclusion as designated in your master.

So, what do I think of Word Writer ST? Like all new things that replace something that you are comfortable and accustomed with, the psychological barriers to change raise themselves. Once this hurdle has

been overcome one eases into the new environment and becomes more accepting, and this is the point where the program can come into its own and be accepted for what it is, rather than what it is not.

I have yet to find a wordprocessing program that I would rate as 10. If I had to give Word Writer ST version 2.00 a rating, I would gauge it to be around 7, with the main problem being the lack of intuitiveness of the spelling checker and the perceived slowness of the program when using the continuous spelling checker. (Do I type too fast?) And, I'm not too sure about some of the extra steps required in a few of the housekeeping functions inherent in any major writing project, not to mention the problems I had with correct formatting. (These problems may have been caused by my own inexperience with Word Writer ST.) All these perceived shortcomings aside, Word Writer ST does the job it sets out to do and deserves to be looked at when considering which wordprocessing program to purchase. It may not be the answer to all the problems to everyone, but then, it doesn't set itself up to be. At around \$120, the program offers you a lot for your money – a word processor, integrated dictionary and thesaurus, plus addressing other writing needs such as Outlines, Reports and Form letters. □

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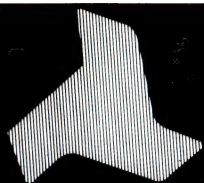
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